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NORTHROP CORP HAWTHORNE CALIF ELECTRONICS DIV
AN/BRN-7 COMPUTER PROGRAM SPECIFICATION. VOLUME
OCT 73

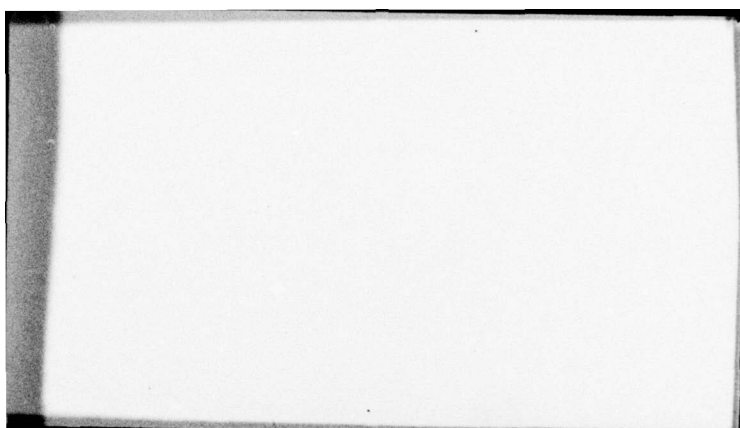
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XIII. APPENDIX.(U)
N00039-73-C-0209
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NORT-73-48

1 OF 4
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VOL XIII

NORTHROP

Electronics Division

<input type="checkbox"/>	This submittal applies to AN/BRN-7 (Submarine Ω) only.
<input type="checkbox"/>	This submittal applies to AN/SRN-() (Hydrofoil Ω) only.
<input checked="" type="checkbox"/>	This submittal applies to both AN/BRN-7 and AN/SRN-().

CONTRACT NO: N00039-73-C-0209

PROGRAM NAME: AN/BRN-7

CDRL No: A01D, A01E, A01F

Title of CDRL: Computer Program Design Specification
Computer Subprogram Design Document
Data Base Design Document

Title of Doc: AN/BRN-7 Computer Program Specification
NORT 73-48
Volume 2 thru 13

Date: 1/16/74

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Prepared by: System Integration Unit
Orgn. Name

A4734 X574
Orgn. No. and Ext.

Approved by:

Norman O. Clark
Supervisor of Preparing
Orgn.

Bill Taylor
Program Mgr.

John J. Oman
Proj. Engr./Proj. Mgr.

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NORT 73-48

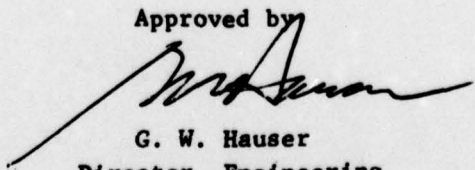
AN/BRN-7 COMPUTER
PROGRAM SPECIFICATION

Volume XIII

APPENDIX

October 12, 1973

Approved by


G. W. Hauser

Director, Engineering
Navigation Department

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Volume XIII
of the
AN/BRN-7 OMEGA COMPUTER
PROGRAM SPECIFICATION

Volume

- I Performance Specification
- II Design Specification
- III Synchronization Subprogram Design
- IV OMEGA Processing Subprogram Design
- V Tracking Filter Subprogram Design
- VI Kalman Filter Subprogram Design
- VII Propagation Prediction Subprogram Design
- VIII Navigation Subprogram Design
- IX Executive Subprogram Design
- X Control-Indicator Subprogram Design
- XI Built-in Test Subprogram Design
- XII Common Subroutines Subprogram Design
- XIII Appendix

SECTION 1**SCOPE**

Volume I, Submarine OMEGA Computer Program Performance Specification, defines the functional requirements for the Submarine OMEGA Computer Program which is used by the AN/BRN-7 OMEGA Navigation Set. The navigation set and the OMEGA program together comprise the Submarine OMEGA Navigation System. The tape which defines the computer program is entitled AN/BRN-7 Navigation Program.

Volume II, Submarine OMEGA Computer Program Design Specification, allocates the functional requirements of Volume I to the computer routine and sub-program level.

This volume is the listing of the Submarine OMEGA Computer Program tape, designated above, whose contents are described by the subprogram design documents, Volumes III through XII of the Submarine OMEGA Computer Program Specification.

SECTION 2**APPLICABLE DOCUMENTS**

- a) Volume I, Submarine OMEGA Computer Program Performance Specification
- b) Volume II, Submarine OMEGA Computer Program Design Specification
- c) Volume III, Synchronization Subprogram Design
- d) Volume IV, OMEGA Processing Subprogram Design
- e) Volume V, Tracking Filter Subprogram Design
- f) Volume VI, Kalman Filter Subprogram Design
- g) Volume VII, Propagation Prediction Subprogram Design
- h) Volume VIII, Navigation Subprogram Design
- i) Volume IX, Executive Subprogram Design
- j) Volume X, Control Indicator Subprogram Design
- k) Volume XI, Built-in-Test Subprogram Design
- l) Volume XII, Common Subroutines Subprogram Design
- m) NORT 71-41 NDC-1070 MACRO ASSEMBLER, MAY 1971
- n) NORT 68-115A, Detailed Description of NDC-1070 Computer Instructions, Revision A, February 1970
- o) NORT 69-87A, NDC-1070 Flow Chart Program User's Manual

SECTION 3**DESCRIPTION**

This volume contains a listing and label cross-reference list for the Submarine OMEGA Operational Computer Program. This listing defines the exact configuration of the SCDP.

The listing and label cross-reference list is an output of the NAP-70 Assembler program that is produced at the same time that punched tape is generated. The NDC-1070 MACRO ASSEMBLER (NORT 71-41) and the NDC-1070 Flow Chart Program User's Manual (NORT 69-87A) describe the format of the listing and the meaning of special characters and symbols.

The overall organization of the listing is given in the table below.

Pages

1 - 4	I/O Equivalence Dictionary
5 - 250	Description of memory location 0 to 1737 in sequential order
251 - 258	Description of variable storage memory location 1B39 to 1FFF in inverse sequential order
259 - 264	Description of memory locations 181D to 1990.
265 - 317	Description of memory locations 1991 in sequential order
318 - 319	Literal listing
320 - 322	Assembler Statistics
323 - 344	Cross-Reference List

Note: Equivalences not in the I/O Dictionary are placed in convenient places in the listing, usually near the instructions that use the equivalences.

Users of the listing and the flow charts should rely on the cross-reference list to locate labels in the listing. In particular, main labels that appear on the flow charts can be quickly located in the listing by looking in the cross-reference list to find the memory location associated with the label

and then turning to that location in the listing. Another important use of the cross-reference list is to identify all the users of an operand. The memory location of every instruction that addresses the operand is given in the cross-reference list entry for that operand.

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|-------------------------------------|--|
| <input type="checkbox"/> | This submittal applies to AN/BRN-7 (Submarine Ω) only. |
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CONTRACT NO: N00039-73-C-0209

PROGRAM NAME: OMEGA NAVIGATIONAL SET
AN/BRN-7 AND AN/SRN-17

CDRL No: A01F

Title of CDRL: DATA BASE DESIGN DOCUMENT

Title of Doc: PROGRAM LISTING
MOD 36 & CORRECTION ON PAGE 83

Date: 19 MAY 1976

Initial Submittal: <input type="checkbox"/>	Release	142,21 May 76
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Prepared by: PROJ. ENGR.
Orgn. Name

4150 545
Orgn. No. and Ext.

NOTE: THIS SUBMISSION IN RESPONSE TO NAVY LETTER 52013B:DC pw
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Approved by:

[Signature]
Supervisor of Preparing
Orgn.

C Jones ^{by [Signature]}
Program Mgr.

W. Weimer 5/20/76
Proj. Engr./Proj. Mgr.

PROGRAM_ID VIS
PROGRAM_ID VIS

"MOD 35 AN/BRN-7 "
"MOD 36 02/06/75 AN/BRN-7 "

10750 NEW 0
10750 REPLACED

LIBRARY OMEGA_IO_DICTONARY 04/04/69

**/ IOC, SET, AND SNS LABEL DEFINITIONS

* IOC CODES

INHIBIT_BOTH_CSE_INTERRUPTS;

LOAD_PRINTER; EQU X(8000) 1000

LOAD_PUNCH; EQU X(DF01) 1101 1111 0001

LOAD_TAPE; EQU X(DF02) 1101 1111 0010

RESET_CMP_INTERRUPT; EQU X(CF01) 1100 1111 0001

INHIBIT_CMP_INTERRUPT; EQU X(9F00) 1001 1111

ENABLE_CMP_INTERRUPT; EQU X(AF00) 1010 1111

READ_START_ADDRESS; EQU X(BF00) 1011 1111

READ_STOP_ADDRESS; EQU X(CF02) 1100 1111 0010

LOAD_PMU_REGISTER; EQU X(CF03) 1100 1111 0011

LOAD_PMU_TIMER; EQU X(DE00) 1101 1110 0000

READ_PMU_KEYBOARD; EQU X(DE0A) 1101 1110 1010

RESET_PMU_INTERRUPT; EQU X(CE08) 1100 1110 1011

RESET_RECORDER_INTERRUPT; EQU X(9E00) 1001 1110

INHIBIT_RECORDER_INTERRUPT; EQU X(9B00) 1001 1011

ENABLE_RECORDER_INTERRUPT; EQU X(A800) 1010 1011

LOAD_RECORDER; EQU X(B800) 1011 1011

PROGRAMMER_CONTROLLER_GO_LIGHT; EQU X(C800) 1100 1011

8CC3 EQU X(8CC3) 000360 000390

1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18

		SET	CODES	
34	000A	RESET_PFG_COUNTDOWN; EQ	X(000A)	0... .. 101.
35	000C	PROGRAM_SEQUENCING; EQ	X(000C)	0... .. 110.
36	0008	MEMORYAugMENTER_GO; EQ	X(0008)	0... .. 100.
37	8000	HIGH_SPEED_PRINTER_OUTPUT; EQ	X(8000)	81TS 1-8 DEFINE CHARACTER CODE 1... 1101 XXXX XXXX
38	8801	INTER_RECORD_GAP; EQ	X(8801)	1000 1011 .... ..01
39	8802	WRITE_FILE_GAP; EQ	X(8802)	1000 1011 .... ..10
40	8E20	DISABLE_MEMORY_PROTECT; EQ	X(8E20)	1... 1110 0010
41	8E21	ENABLE_MEMORY_PROTECT; EQ	X(8E21)	1... 1110 0010 ....1
42	8E10	* PMU_INDICATORS; EQ	ADDENDA FOR PMU INDICATORS	
43	0008	ALPHA EQ	X(8E10)	1... 1110 0001 0000
44	0004	BETA EQ	X(0008)	.... .... 1...
45	0002	GAMMA EQ	X(0004)	.... .... 1...
46	0001	ERROR EQ	X(0002)	.... .... 1...
47	8F10	* TAPE_CONTROL; EQ	X(0001)	.... .... 1...
48	0001	FORWARD EQ	X(8F10)	1... 1111 0001 0000
49	0002	RUN EQ	X(0001)	.... .... 1...
50	0004	VERIFY_ON EQ	X(0002)	.... .... 1...
51	0008	SELFTEST_ON EQ	X(0004)	.... .... 1...
52	0000	REVERSE EQ	X(0008)	.... .... 1...
53	0000	STOP EQ	X(0000)	.... .... 1...
54	8F20	* TAPE_FILL EQ	ADDENDA FOR TAPE FILL	
55	0000	ENABLE_READ EQ	X(8F20)	1... 1111 0010 0000
56	0001	INHIBIT_READ; EQ	X(0000)	.... .... 1...
57	0002	FORCE EQ	X(0001)	.... .... 1...
			X(0002)	.... .... 1...

FLAG AND LGC EQUIVALENCE TABLE

1. CONDITION CODES

58	0000	UC	EQU	X(0000)
59	0010	NE	EQU	X(0010)
60	0020	GE	EQU	X(0020)
61	0030	LE	EQU	X(0030)
62	0040	LE	EQU	X(0040)
63	0050	L	EQU	X(0050)
64	0060	E	EQU	X(0060)
65	0070	NO	EQU	X(0070)
66	0080	AT	EQU	X(0080)
67	0090	AF	EQU	X(0090)
68	00A0	BT	EQU	X(00A0)
69	00B0	BF	EQU	X(00B0)
70	00C0	CT	EQU	X(00C0)
71	00D0	CF	EQU	X(00D0)
72	00E0	DT	EQU	X(00E0)
73	00F0	DF	EQU	X(00F0)

2. FLIP-FLOP CODES

74	0000	A	EQU	X(0000)
75	0001	B	EQU	X(0001)
76	0002	C	EQU	X(0002)
77	0003	D	EQU	X(0003)
78	0000	INTERRUPT_INHIBIT	EQU	X(0000)
79	0001	DMA_INHIBIT	EQU	X(0001)
80	0002	PIN_MODE	EQU	X(0002)

3. LOGIC CODES

81	0000	UCD	EQU	X(0000)
82	0004	OR	EQU	X(0004)
83	0008	AND	EQU	X(0008)
84	000C	EOR	EQU	X(000C)
85	0010	FLOATER_ANTENNA	EQU	X(0010)

INERTIAL_SYSTEM_NO_GO

FLOATER_ANTENNA

MOD	36	05/18/76	AN/BRN-7	PAGE	5
*	**			001530	
*		001 = BLOCK 1		001540	
*		MAIN PROGRAM		001550	
*		002 = BLOCK 2		001560	
*		DEBUG ROUTINE		001570	
*				001580	
*		004 = BLOCK 3		001590	
*		TEST ROUTINES - EITHER BLOCK 2 OR 4 MUST BE LOADED AT FILL		001600	
*				001610	
*		008 = BLOCK 4		001620	
*		MAGNETIC TAPE DATA ROUTINE		001630	
*				001640	
*		010 = BLOCK 5		001650	
*		PLOT - MODIFIES MAIN PROGRAM		001660	
*				001670	
*		020 = BLOCK 6		001680	
*		DECIMAL PRINT ROUTINES		001690	
*		040 = BLOCK 8		001700	
*		SIMULATOR, PROGRAMMER CONTROLLER FAILURE DISPLAY		001710	
*		080 = BLOCK 9		001720	
*		PRODUCTION INSP UNUSED I/O TEST		001730	
*		100 = BLOCK 10		001740	
*		NAV PERF TEST		001750	
*		200 = BLOCK 11		001760	
*		PCI, DYNAMIC RANGE-RANDOM NOISE TEST DISPLAYS 91 ON CI PANEL		001770	
*		400 = BLOCK 12		001780	
*		SRN-17 OPERATIONAL OVERLAY		001790	
*				001800	
*		800 = BLOCK 13		001810	
*		LITERALS - DOES NOT MODIFY MAIN PROGRAM		001820	
*		MUST BE LOADED WHENEVER MAIN PROGRAM IS LOADED		001830	

MOD 36 05/18/76 AM/3RN-7 OMEGA_FILL_PUNCH

PAGE 6

001840
001850
001860
001870

* FILL, COMPARE AND PUNCH PROGRAM DESCRIPTION

* THIS PROGRAM IS CONTROLLED FROM THE START ADDRESS SWITCHES ON THE
* MAINTENANCE PANEL

* 6XXX = FILL

* 7XXX = COMPARE, PUNCH AND PRINT

* 8XXX = COMPARE AND PRINT

* YXXX = HALT AND RESTART IF COMPUTE IS PRESSED

* XXX = BLOCK SELECTOR BITS

* FILL - LOAD THE SELECTED BLOCKS INTO CORE. IF BLK1 IS SELECTED
* CLEAR CORE FIRST. FOR BLK2 AND UP MODIFY CHECKSUM. CLEAR
* MOST OF CORE USED BY FILL PROGRAM AFTER COMPLETING FILL.
* PUT BLK SELECTOR BITS INTO BITS 5-16 OF TAPE ID WORD.

* COMPARE, PUNCH AND PRINT - UPDATE CORR NO BY 1 AND COMPARE THE
* SELECTED BLOCKS WITH CORE. PUNCH AND PRINT DIFFERENCES. PUT
* BLK SELECTOR BITS IN FIRST 3 CHARACTERS OF CORR NUMBER ON
* VISUALS. DECREMENT CORR NO AFTER COMPLETION. IF BLK1 IS
* SELECTED ALSO PUNCH AND PRINT ALL NON ZERO WORDS WHERE GAPS
* OCCUR ON THE TAPE BETWEEN START_CHECKSUM AND END_CHECKSUM. ALSO
* PUNCH OR PRINT ALL NON ZERO WORDS BETWEEN LAST_WORD+1 AND
* RCLL-1.

* COMPARE AND PRINT - IDENTICAL TO COMPARE, PUNCH AND PRINT EXCEPT NO
* MODIFICATION OF CORR NO AND NO PUNCHING OF A CORR TAPE.

* BLOCK SELECTOR BITS - THESE BITS TELL THE PROGRAM WHAT BLKS TO
* PROCESS. THE SUM OF THE DESIRED BLOCK NUMBERS SHOULD BE
* SET IN THE MAINTENANCE PANEL START ADDRESS SWITCHES.

* 001 = BLOCK 1

* MAIN PROGRAM LESS LITERALS - NOTE - ANY CORR TAPES PUNCHED
* WITH BLK 1 SELECTED WILL ALSO CONTAIN ANY BLKS IN CORE THAT
* MODIFY MAIN PROGRAM IN ADDITION TO ALL CORRS TO MAIN PROGRAM
* AND THOSE BLKS SHOULD NOT BE FILLED WHEN USING THE
* CORR TAPE. IF BLKS THAT DO NOT MODIFY MAIN PROGRAM ARE IN
* CORE WHEN PUNCHING A TAPE BUT THE BLKS HAVE THEMSELVES BEEN
* MODIFIED THEN THOSE BLKS SHOULD BE SELECTED FOR THE CORR

001880
001890
001900
001910
001920
001930
001940
001950
001960
001970
001980
001990
002000
002010
002020
002030
002040
002050
002060
002070
002080
002090
002100
002110
002120
002130
002140
002150
002160
002170
002180
002190
002200
002210
002220
002230
002240
002250
002260

MQD 36 05/18/76 AN/BRN-7

TAPE AND MUST ALSO BE FILLED EVERY TIME THAT CORR TAPE IS USED. ANY BLK MAY BE LOADED AFTER THE CORR TAPE AND THE APPROPRIATE BLKS ARE LOADED INITIALLY.

Address	Size	Symbol	Value	Comment
86	4R	4,X(F2)		TAPE
87	3,12	3,12		TAPE
88	4,X(F1)	4,X(F1)		TAPE
89	1	1		TAPE
90		SCS		SCS
91	2000	_CORE_SIZE		EQU
92	1D00	_CORE_SIZE-X(300)		ORG
93	1D00	14,_ROLL_END		CLAM
94	12	DISABE_MEMORY_PROTECT		SET
95	16	15,_ROLL_14		CLAM
96	20	2,_END_CKSUM		CLAM
97	24	1,__VERIFY		CLAM
98	26	0,0		SUB
99	6R	10,1		ADD
100	14	1,_\$4		BXU
101	4R	\$5		BRE
102	8R	TAPE_CONTROL+STOP		SET
103	12	HLT		HLT
104	2R	2,_15		CLAM
105	6	0,0		SUB0
106	10R	0,0		STA
107	18	1,_\$1		BXU
108	8R	0,_X(8000)		FETM
109	18	0,_BLOCK_NO+1		PTR
110	26	ENABLE_CMP_INTERRUPT		ICG
111	34	TAPE_FILL+INHIBIT_READ		SET
112	42	READ_START_ADDRESS		IOC
113	52	0,_PPTMP		PIP
114	60	0,_PPTMP		CLA
115	68	1,0,_XOFFF		EXT
116	78	1,_BLOCKS		STA
117	80	0,1		SUB
118	90	0,_FILL_COMP		STA
119	94	0,_X(8000)		COMM
120	98	_COMPARE		BRE
121	4R	0,_X(7000)		COMM
122	8	_PUNCH_TAPE		BRE
123	4R	0,_X(6000)		COMM

124	8	1D33	D064	(1D38)	BR	\$3		PAGE 8
125	8R	1D34	FC0F8F10		SET		TAPE_CONTROL+STOP	PV002700
126	12	1D36	0000		HLT			PV002710
127	16	1D37	D808	(1D00)	BUC			PV002720
128	4R	1D38	F4148000		LSA		CLEAR IF BLOCK 1	PV002730
129	8	1D3A	D320	(1D68)	BGE	1,15		PV002740
130	4R	1D38	FC291CFF		CLAM	_START		PV002750
131	8	1D3D	8800		SUBD	2, _VERIFY-1		PV002760
132	8R	1D3E	7110		STA	0,0		PV002770
133	16	1D3F	C412	(1D3E)	BXU	X1,0		PV002780
134	4R	1D40	D20A	(1D68)	BUC	1, \$2		PV002790
						_START		PV002800

MOD 36 05/18/76 AM/BRN-7

MOD 36 05/18/76 AN/BRN-7				TEST FOR GAP		PAGE 10	
177	4	1089	8005	COM	0,5	PH003240	
178	8	108A	D023 (108E)	BGE	\$3	PH003250	
179	8R *	108B	F80D10E2	BSV	\$5	PH003260	
180	12	108D	D806 (1088)	BUC	\$2	PH003270	
181	4R	108E	F859183C	COMM	5,ROLL	PH003280	
182	8	1090	D025 (1096)	BGE	\$4	PH003290	
183	2R	1091	A405	CLA	0,5	PH003300	
184	4	1092	A4A4	CLA	10,4	PH003310	
185	12 *	1093	F80D10E2	BSV	\$5	PH003320	
186	16	1095	D908 (1078)	BUC	\$1	PH003330	
187	10R	1096	F00C1F62	FET	0,,-FILL_COMP	PH003340	
188	14	1098	F8096000	COMM	0,,-X(6000)	PH003350	
189	18	109A	D01B (10A6)	BNE	\$12	PH003360	
190	8R	109B	F40A1F5F	CLA	0,,-BLOCK_NO	PH003370	
191	16	109D	E4001F50	EXT	0,0,-BLOCKS	PH003380	
192	20	109F	D066 (10A6)	BRE	\$12	PH003390	
193	8R	10A0	F47A1F61	CLA	7,,-CHECK_SUM	PH003400	
194	16	10A2	F47B1946	ADD	7,,-END_CKSUM	PH003410	
195	26	10A4	F0771946	STA	7,,-END_CKSUM	PH003420	
196	2R	10A6	9C00	CLAM	0,0,0	PH003430	
197	12	10A7	F4071F61	PTR	0,,-CHECK_SUM	PH003440	
198	22	10A9	F00C1F5E	FET	0,,-END_TAPE	PH003450	
199	26	10AB	D01A (1086)	BNE	0,,-BLOCK_NO	PH003460	
200	8R	10AC	F40A1F5F	LSA	0,,-BLOCKS	PH003470	
201	12	10AE	4402	COMM	0,,-BLOCKS	PH003480	
202	20	10AF	F0081F50	BRG	0,,-BLOCKS	PH003490	
203	24	10B1	D034 (1086)	SET	NO MORE BLOCKS TO PROCESS IF MORE THAN NEXT BLOCK NUMBER	PH003500	
204	8R	10B2	F00F8F13	PRN	TAPE_CONTROL+FORWARD+RUN	PH003510	
205	16	10B4	D700	BUC	0	PH003520	
206	20	10B5	D808 (1078)	STAD	\$1	PH003530	
207	12R	10B6	F8970144	IOC	9,,-X(144)	PH003540	
208	20	10B8	F80F8F00	SET	INHIBIT_CMP_INTERRUPT	PH003550	
209	28	10BA	F00F8F21	SET	TAPE_FILL+INHIBIT_READ	PH003560	
210	36	10BC	F00F8F12	SET	TAPE_CONTROL+RUN+REVERSE	PH003570	
211	44	10BE	F40A1F62	CLA	0,,-FILL_COMP	PH003580	
212	48	10C0	F8096000	COMM	0,,-X(6000)	PH003590	
213	52	10C2	D161 (10D4)	BRE	\$23	PH003600	
214	8R	10C3	D700	PRN	0	PH003610	
215	18	10C4	F0770152	STA	7,,-X(152)	PH003620	
216	28	10C6	F067014C	STA	6,,-CORR_CKSUM	PH003630	
217	36	10C8	F4080073	FETM	0,,-X(73)	PH003640	
218	44 *	10CA	F80D1E29	BSV	-PUNCH	PH003650	
219	52	10CC	F4080074	FETM	0,,-X(74)	PH003660	
					INHIBIT FORCE-FILL		
					TAPE-REVERSE CHARACTER		

MOD 36 05/18/76 AN/BRN-7

PH003670	PH003680	PH003690	PH003700	PH003710	PH003720	PH003730	PH003740	PH003750	PH003760	PH003770	PH003780	PH003790	PH003800	PH003810	PH003820	PH003830	PH003840	PH003850	PH003860	PH003870	PH003880	PH003890	PH003900	PH003910	PH003920	PH003930	PH003940	PH003950	PH003960	PH003970	PH003980	PH003990	PH004000	PH004010	PH004020	PH004030	PH004040	PH004050	PH004060	PH004070	PH004080	PH004090			
220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261				
60	70	78	12R	10R	13	3R	18	28	38	4R	10R	18	22	12R	8R	12	16	10R	4R	8	2R	4	8	8	8	2R	4	8	6R	14	10R	24	8R	12	16	2R	6	4R	8	2R	6				
1DC E	F80D1F29	F41801F3	F80D1FA2	F1171D61	C413 (1006)	F4083FF	1D08 F0071F68	1D0D F0071F6F	1D0F F0071F79	1D61 0000	1DE2 F00C1F5F	1DE4 E4001F5D	1DE6 D011 (1DE8)	1DE7 D500	1DE8 F40A1F62	1DEA F8096000	1DEC D113 (1E00)	1DED FC0C1F61	1DEF F8290144	1DF1 D013 (1DF5)	1DF2 840A	1DF3 A4AC	1DF4 D008 (1DFD)	1DF5 F8290145	1DF7 D013 (1DF8)	1DF8 8408	1DF9 A48C	1DFA D002 (1DFD)	1DFB 8602	1DFC 72C2	1DFD F0071F61	1DFF D510	1E00 D700	1E01 F8090144	1E03 D012 (1E06)	1E04 A418	1E05 D006 (1E0C)	1E06 F8090145	1E08 D012 (1E08)	1E09 A419	1E0A D001 (1E0C)				
* COMPARE DATA OR FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL	DATA	OR	FILL
\$21	\$5	\$23	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22	\$21	\$22		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0																																								

PAGE 12
PH004100
PH004110
PH004120
PH004130

262	GR	1E08	A610	MOD 36	05/18/76	AM/BRN-7	11,0
263	2R	1E0C	801A	\$7		CLA	1,10
264	6	1E0D	0C11	\$3		COM	PPDATA
265	8R	1E0E	D5F0	(1E0F)		BNE	15
						8BK	

302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331				
9R	18R	8R	10	14	4R	2R	10	18 *	4R	8	8R *	16 *	8R *	6R	12	20	28	2R	10R	8R	12	8R	18	22	26	4R	4R	8	12R				
1E48 C411	1E49 D530	1E4A F4080081	1E4C 9814	1E4D 0067 (1E55)	1E4E FC090081	1E50 8C51	1E51 F4080084	1E53 F80D1E66	1E55 F8590038	1E57 D828 (1E50)	1E58 F80D1E65	1E5A F80D1E5C	1E5C F80D1E5E	1E5E F4150010	1E60 8400	1E61 E4021F56	1E63 F50A1E57	1E65 9451	1E66 F0071F5C	1E68 F40F8F10	1E6A D823 (1E68)	1E6B F80FDF01	1E6D FC0D1F5C	1E6F F8090084	1E71 D015 (1E77)	1E72 FC057FFF	1E74 FC090001	1E76 D833 (1E74)	1E77 D500				
MUD 35	05/18/76	AN/BRN-7	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3			
1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3	1,,\$61	3		
PRINT WORD IN R1, TYPE (ADDRESS OR DATA) IN R0	SPACE	TEST FOR DATA WORD	BRANCH IF SO	SPACE	RESET CHARACTER POSITION	NEW LINE	END OF LINE 12 WORDS	PRINT	PRINT TWO DIGITS	PRINT ONE DIGIT	PRINT ONE CHARACTER	ADVANCE CHARACTER POSITION	ADDN	STA	SNS	BGE	IOC	POP	COMM	BNE	CLAM	2SUBM	BRG	BBK	0	0	0	0	0	0	0		
PH004570	PH004580	PH004590	PH004600	PH004610	PH004620	PH004630	PH004640	PH004650	PH004660	PH004670	PH004680	PH004690	PH004700	PH004710	PH004720	PH004730	PH004740	PH004750	PH004760	PH004770	PH004780	PH004790	PH004800	PH004810	PH004820	PH004830	PH004840	PH004850	PH004860	PH004870	PH004880	PH004890	PH004900

MOD	36	05/12/76	AN/BRN-7	** PUNCH VISUAL FROM RO,1 IN FOUR GROUPS OF TWO	PAGE 1
332	12R	1E78 9433		-PUNCHBCD FETM 3,,3	PH004910
333	20	1E79 F4C80084		FETM 0,,X(84)	PH004920
334	28 *	1E78 F8001E66		BSV -PRINT	PH004930
335	36	1E70 C015		FET 1,5	PH004940
336	42	1E7E 9400		FETM 0,,0	PH004950
337	50 *	1E7F F8001E4A		BSV -PRINT_WORD	PH004960
338	52	1E81 A418		CLA 1,8	PH004970
339	54	1E82 9C00		CLAM 0,,0	004980
340	62 *	1E83 F8001E4A		BSV -PRINT_WORD	004990
341	74	1E85 D720		PRN 2	PH005000
342	8R *	1E86 F8001E8F	\$1	BSV -PUNCHWIS	PH005010
343	16 *	1E88 F8001E8F		BSV -PUNCHWIS	PH005020
344	20	1E8A 8800		SUBD 0,0	PH005030
345	28 *	1E8B F8001E96		BSV -PUNCHWIS\$1	PH005040
346	36	1E8D C428 (1E86)		8XU 2,,\$1	PH005050
347	22R	1E8E D550		88K 5	PH005060
348	8R	1E8F E4031F56	*	-PUNCHWIS EXT 0,5,-X000F	PH005070
349	18	1E91 F9450800		RSLD 4,,4	PH005080
350	20	1E93 8400		ADD 0,0	PH005090
351	30	1E94 F00A1E47		CLAD X0,,_VISTABLE	PH005100
352	8R	1E96 8415	\$1	FETM 1,,5	PH005110
353	6R	1E97 C003	\$2	FET 0,3	PH005120
354	14	1E98 E4001F57		EXT 0,0,-X003F	PH005130
355	22 *	1E9A F8001E25		BSV -PUNCH	PH005140
356	32	1E9C F8250200		RSLD 2,,6	PH005150
357	40	1E9E C408 (1E97)		8XU 0,,\$2	PH005160
358	14R	1E9F D510		88K 1	PH005170
359	10R	1EA0 F41800C7	*	PUNCH BLANK LEADER	PH005180
360	6R	1EA2 8400	\$1	-PPLEADER FETM 1,,199	PH005190
361	14 *	1EA3 F8001E25		BSV 0,,0	PH005200
362	22	1EA5 C404 (1EA2)		8XU -PUNCH	PH005210
363	14R	1EA6 D510		88K 1	PH005220
					PH005230
					PH005240
					PH005250

364	1EA7	1E86185E	CONC	X(13D0C308C1)/2	0	PH005260
365	1EA9	0C88F800	CONC	X(10117F0001)/2	1	PH005270
366	1EAB	32A69A66	CONC	X(1654034CC1)/2	2	PH005280
367	1EAD	2196595A	CONC	X(1432C82841)/2	3	PH005290
368	1EAF	0830AFC8	CONC	X(110615F901)/2	4	PH005300
369	1EB1	27565959	CONC	X(14F2C82821)/2	5	PH005310
370	1EB3	1EA69A50	CONC	X(13D4034A01)/2	6	PH005320
371	1EB5	31449143	CONC	X(1628922861)/2	7	PH005330
372	1EB7	1A96595A	CONC	X(1352CB2841)/2	8	PH005340
373	1EB9	1296595E	CONC	X(1252CB28C1)/2	9	PH005350
374	1EB8	3E14517E	CONC	X(17C28A2FC1)/2	A	PH005360
375	1EBD	21FE595A	CONC	X(143FC82841)/2	B	PH005370
376	1EBF	1E861852	CONC	X(13D0C30A41)/2	C	PH005380
377	1EC1	21FE185E	CONC	X(143FC308C1)/2	D	PH005390
378	1EC3	3F565961	CONC	X(17F2C82C21)/2	E	PH005400
379	1EC5	3F145141	CONC	X(17E28A2821)/2	F	PH005410
* PPTABLE						
380	1EC7	0038	CON	X(138)	0	PH005420
381	1EC8	007F	CON	X(17F)	1	PH005430
382	1EC9	0076	CON	X(176)	2	PH005440
383	1ECA	003E	CON	X(13E)	3	PH005450
384	1ECB	0075	CON	X(175)	4	PH005460
385	1ECC	0030	CON	X(13D)	5	PH005470
386	1ECD	0034	CON	X(134)	6	PH005480
387	1ECE	007C	CON	X(17C)	7	PH005490
388	1ECF	0079	CON	X(179)	8	PH005500
389	1ED0	0031	CON	X(131)	9	PH005510
390	1ED1	004F	CON	X(14F)	A	PH005520
391	1ED2	0046	CON	X(146)	B	PH005530
392	1ED3	000E	CON	X(10E)	C	PH005540
393	1ED4	0045	CON	X(145)	D	PH005550
394	1ED5	0000	CON	X(100)	E	PH005560
395	1ED6	0004	CON	X(104)	F	PH005570

MOD 36 05/18/76 AN/BRN-7

** TAPE READER INTERRUPT ROUTINE

* REGISTERS USED:

* 0 TRIPLET ASSEMBLY

* 1 CURRENT ADDRESS

* 2 TRIPLET COUNTER

* 3 CONTROL TYPE

* 4 BUFFER INDEX

* 5 BUFFER COUNT

* 6 ADDRESS VAL ID

* 7 SCRATCH

PAGE 18

426	8R	1EFD	F80F9F00	RESET_CMP_INTERRUPT	PV005920
427	16	1EFF	F80FCF01	READ_TAPE	PV005930
428	26	1F01	F40D1F6A	0,,_TAPE_DATA+7	PV005940
429	64	1F03	F07C1F63	7,,_TAPE_DATA	PV005950
430	72	1F05	E4771F59	7,7,_X007F	PV005960
431	76	1F07	F879007F	7,,X(7F)	PV005970
432	80	1F09	D068 (1F15)	\$1	PV005980
433	4R	1F0A	F879003F	7,,X(3F)	PV005990
434	8	1F0C	D048 (1F18)	\$2	PV006000
435	4R	1F0D	F8790070	\$7	PV006010
436	8	1F0F	D228 (1F38)	\$2	PV006020
437	8R	1F10	E4371F58	\$7	PV006030
438	10	1F12	B073	3,7,_X0070	PV006040
439	12	1F13	A407	7,3	PV006050
440	14	1F14	9C22	0,7	PV006060
441	34R	1F15	F4671F63	2,,2	PV006070
442	46	1F17	D5Q0	6,,_TAPE_DATA	PV006080
				0	PV006090
				PROCESS INFORMATION ONLY	PV006100
443	2R	1F18	9830	COMM	PV006110
444	6	1F19	D865 (1F15)	BRE	PV006120
445	4R	1F1A	F4040040	LSA	PV006130
446	6	1F1C	B407	ADD	PV006140
447	8	1F1D	9021	SUBM	PV006150
448	12	1F1E	D83A (1F15)	BRG	PV006160
				\$1	PV006170
				PROCESS COMPLETE TRIPLET	PV006180
449	4R	1F1F	F8390050	COMM	PV006190
450	8	1F21	D232 (1F44)	BRE	PV006200
451	4R	1F22	D1G1 (1F34)	LSA	PV006210
452	2R	1F23	9860	ADD	PV006220
453	6	1F24	D560 (1F15)	SUBM	PV006230
454	12R	1F25	F9471F6C	BRG	PV006240
455	14	1F27	9442	COMM	PV006250
456	18	1F28	F849005C	COMM	PV006260
				3,,X(50)	PV006270
				\$8	PV006280
				BRE	006290
				\$5	PV006300
				6,,0	PV006310
				\$1	PV006320
				X4,,_BUFFER	PV006330
				4,,2	PV006340
				4,,_BUFFER_LIM	

REMOVE PARITY

SKIP IF DELETE CODE

SKIP UNLESS CONTROL CODE

SKIP IF SUB-CONTROL

FIRST FOUR INFORMATION BITS

COUNT FOR TWO MORE CHARACTERS

IGNORE IF NO PRIOR CONTROL

ASSEMBLE INFORMATION

TEST FOR END OF TRIPLET

SKIP IF END FORCE FILL

SKIP IF ADDRESS

457	22	1F2A	0051	(1F2C)	BRL	\$3	PAGE 19
458	2R	1F2B	9C40		CLAM	4,00	PV006350
459	2R	1F2C	9452	\$3	ADDH	5,02	PV006360
460	6	1F2D	F859005C		COMM	5,00	PV006370
461	10	1F2F	0052	(1F32)	BRL	\$4	PV006380
462	8R	1F30	F00F8F11		SET	TAPE_CONTROL*STOP+FORWARD	PV006390
463	2R	1F32	9411	\$4	ADDH	1,01	PV006400
464	6	1F33	0002	(1F36)	BUC	\$6	006410
465	2R	1F34	9C61		CLAM	6,01	006420
466	4	1F35	A410	\$5	CLA	1,0	006430
467	2R	1F36	9C30	\$6	CLAM	3,00	006440
468	6	1F37	DA03	(1F15)	BUC	\$1	PV006450
							PV006460
							PV006470
469	4R	1F38	F8790071	\$7	COMM	7,0X(71)	PV006480
470	8	1F3A	0016	(1F41)	BNE	\$9	PV006490
471	14R	1F3B	F80C1F5F		FETD	0,00_BLOCK_NO	PV006500
472	20	1F3D	4C02		LSAD	0,01	PV006510
473	34	1F3E	FC071F5F		PTRD	0,00_BLOCK_NO	PV006520
474	38	1F40	D808	(1F36)	BUC	\$6	PV006530
475	4R	1F41	F8790073	\$9	COMM	7,0X(73)	PV006540
476	8	1F43	0014	(1F48)	BNE	\$10	PV006550
477	9R	1F44	F00F8F11	\$8	SET	TAPE_CONTROL*STOP+FORWARD	PV006560
478	10	1F46	8C61		CLSM	6,01	PV006570
479	14	1F47	DB03	(1F15)	BUC	\$1	PV006580
480	4R	1F48	F8790074	\$10	COMM	7,0X(74)	PV006590
481	8	1F4A	DB16	(1F15)	BNE	\$1	PV006600
482	6R	1F4B	8401		FETM	0,01	PV006610
483	16	1F4C	F4071F5E		PTR	0,00_END_TAPE	PV006620
484	24	1F4E	F80FAF00		IOC	INHIBIT_CMP_INTERRUPT	PV006630
485	32	1F50	F00F8F21		SET	TAPE_FILL+INHIBIT_READ	006640
486	40	1F52	F00F8F12		SET	TAPE_CONTROL*RUN+REVERSE	PV006650
487	46	1F54	04001F15		BUC	\$1	PV006660

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488	IF56	Q00F	-X000F	CON	X(000F)	PV006680
489	IF57	Q03F	-X003F	CON	X(003F)	PV006690
490	IF58	Q070	-X0070	CON	X(0070)	PV006700
491	IF59	Q07F	-X007F	CON	X(007F)	PV006710
492	IF5A	Q0FF	-X00FF	CON	X(00FF)	PV006720
493	IF5B	4CF6	-END_CKSUM	ECS		PV006730
494	IF5C	Q000	-PTEMP	CON	0	PV006740
495	IF5D		-BLOCKS	EQ	-PTEMP+1	PV006750
496	IF5E		-END_TAPE	EQ	-BLOCKS+1	PV006760
497	IF5F		-BLOCK_NO	EQ	-END_TAPE+1	PV006770
498	IF61		-CHECK_SUM	EQ	-BLOCK_NO+2	PV006780
499	IF62		-FILL_COMP	EQ	-CHECK_SUM+1	PV006790
500	IF63		-TAPE_DATA	EQ	-FILL_COMP+1	PV006800
501	IF6C		-BUFFER	EQ	-TAPE_DATA+9	PV006810
502	Q05C		-BUFFER_LIM	EQ	92	006820
503	IFC8		-ROLL	EQ	-BUFFER+_BUFFER_LIM	PV006830
504	IFE6		-ROLL_14	EQ	-ROLL+30	PV006840
505	IFFA		-ROLL_END	EQ	-ROLL_14+20	PV006850
506				TAPE	2,_VERIFY	PV006860
507				TAPE	3,12	PV006870
508				TAPE	4,X(F1)	PV006880
						006890

NUMBER OF STATIONS TRACKED
STATION IMAGE FOR DISPLAY

X(01FE)

EQU
EQUDS
DSHEX0008
01FE

DIRECT MEMORY ACCESS (DMA)

C_I_INPUT_MISCELLANEOUS_SWITCHES;

EQU X(0001)

C_I_INPUT_KEYBOARD_SWITCHES;

EQU X(0002)

C_I_LEFT_DISPLAY;

EQU X(0003)

C_I_LEFT_DISPLAY_DIGITS_6_TO_3;

EQU X(0003)

C_I_LEFT_DISPLAY_DIGITS_2_TO_1;

EQU X(0004)

C_I_RIGHT_DISPLAY;

EQU X(0005)

C_I_RIGHT_DISPLAY_DIGITS_6_TO_3;

EQU X(0005)

C_I_RIGHT_DISPLAY_DIGITS_2_TO_1;

EQU X(0006)

C_I_LEFT_DISPLAY_LEGEND_AND_PUNCTUATION;

EQU X(0007)

C_I_RIGHT_DISPLAY_LEGEND_AND_PUNCTUATION;

EQU X(0008)

C_I_OUTPUT_LAMPS_MISCELLANEOUS_SWITCHES;

EQU X(0009)

C_I_OUTPUT_MALFUNCTION_STATUS_INDICATORS;

EQU X(0009)

C_I_UPPER_LEFT_KEYBOARD_LAMPS;

EQU X(0008)

C_I_UPPER_RIGHT_KEYBOARD_LAMPS;

EQU X(000C)

C_I_LOWER_KEYBOARD_LAMPS;

EQU X(000D)

*

SUM_T_ZERO_DCT;

EQU

X(000E)

000E

526

526

006900

006910

006920

006930

006940

006950

006960

006970

006980

006990

007000

007010

007020

007030

007040

007050

007060

007070

007080

007090

007100

007110

007120

007130

007140

007150

007160

007170

007180

007190

007200

007210

007220

007230

007240

007250

007260

007270

007280

007290

007300

007310

007320

527	0010	PHASE_COUNTER_TEST_LOCATION; EQ	X(0010)	007350
527	0011			007360
528	0012	COS_10_2 EQ	X(0011)	007370
529	0013	SIN_10_2 EQ	X(0012)	007380
530	0014	COS_13_6 EQ	X(0013)	007390
531	0015	SIN_13_6 EQ	X(0014)	007400
532	0016	COS_11_33 EQ	X(0015)	007410
533	0017	SIN_11_33 EQ	X(0016)	007420
534		DIRECT_MEMORY_ACCESS_TEST_LOCATION; EQ	X(0017)	007430
534	0018	CH0;		007440
535	0019			HH007450
535	0018	CH1;	X(0018)	007460
536	0019			HH007470
536	0019	TRUE_HEADING_INPUT; EQ	X(0019)	007480
537	001A			HH007490
537	001A	TRUE_AIR_SPEED_INPUT,SHIP_SPEED_INPUT; EQ	X(001A)	007500
538	001B			HH007510
538	001B	A_TO_Q_CONVERTER_TEST_LOCATION; EQ	X(001B)	007520
539	001C			HH007530
539	001C	CH5;	X(001C)	007540
540	001D			HH007550
540	001D	CH6;	X(001D)	007560
541	001E			HH007570
541	001E	CH7;	X(001E)	007580
542	001F			HH007590
542	001F	ANTENNA_SWITCHING_MATRIX_OUTPUT_10_2; EQ	X(001F)	007600
543	0020			007610
543	0020	ANTENNA_SWITCHING_MATRIX_OUTPUT_13_6; EQ	X(0020)	007620
544	0021			007630
544	0021	ANTENNA_SWITCHING_MATRIX_OUTPUT_11_33; EQ	X(0021)	007640
545	0022			007650
545	0022	OUTPUT_TEST_AND_MISCELLANEOUS SIGNALS; EQ	X(0022)	007660
546	0023			007670
546	0023		X(0023)	007680

** * START EXTENDED ADDRESSING - VARIABLE STORAGE

567	0080		ORG	X(0080)		008020
568	0080	0000	RESET_TF	CON	0	008030
569			POSITION_NOISE;			008040
570	0081	00000000	COND			008050
571	0083	0000	CON			008060
572	0084	0000	CON			008070
573	0085	00000000	COND			008080
574	0087	00000000	COND			008090
575	0089	00000000	COND			008100
576	0085		TF_TEMP			008110
577	0087		TF_TEMP			008120
578	0089		TF_TEMP			008130
579	0085		TF_TEMP			008140
580	0087		TF_TEMP			008150
581	0089		TF_TEMP			008160
582	0085		TF_TEMP			008170
583	0087		TF_TEMP			008180
584	0089		TF_TEMP			008190
585	0085		TF_TEMP			008200
586	0087		TF_TEMP			008210
587	0089		TF_TEMP			008220
588	0085		TF_TEMP			008230
589	0087		TF_TEMP			008240
590	0089		TF_TEMP			008250
591	0085		TF_TEMP			008260
592	0087		TF_TEMP			008270
593	0089		TF_TEMP			008280
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595	0087		TF_TEMP			008300
596	0089		TF_TEMP			008310
597	0085		TF_TEMP			008320
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600	0085		TF_TEMP			008350
601	0087		TF_TEMP			008360
602	0089		TF_TEMP			008370
603	0085		TF_TEMP			008380
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785	0089		TF_TEMP			
786	0085					

MCD 36 05/18/76 AM/BRN-7

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592	009C	0000	START_OMEGA_NOM:	CCN	0	008450
593	009D	0000	PAST_NAV_MCDE:	CCN	0	008460
594	009E	00000000	IMAGE9	COND	0	008470
595	009F		C_I_STATUS_IMAGES:	CCN	0	008480
596	00A0	0000	DB_SAVE	CCN	0	008490
597	00A1	0000	PMU_INDICATOR_WORD:	CCN	0	008500
598	00A2	00000000	V2	COND	0	008510
599	00A3		V3	CCN	0	008520
600	00A4	0000	SLOW_RATE	CCN	0	008530
601	00A5	0000	WINDCHAD	CCN	0	008540
602	00A6	0000	PC_INSERT	CCN	0	008550
603	00A7	0000	STATION_INDEX:	CCN	0	008560
604	00A8	00000000	TIME_INC	CCN	0	008570
605	00A9	00000000	DB_BUFFER	CCN	0	008580
606	00AA	00000000		CCN	0	008590
607	00AB	00000000		CCN	0	008600
608	00AC	00000000		CCN	0	008610
609	00AD	00000000		CCN	0	008620
610	00AE	00000000		CCN	0	008630
611	00AF	00000000		CCN	0	008640
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615	00B3	00000000		CCN	0	008680
616	00B4	00000000		CCN	0	008690
617	00B5	00000000		CCN	0	008700
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620	00B8	00000000		CCN	0	008730
621	00B9	00000000		CCN	0	008740
622	00BA	00000000		CCN	0	008750
623	00BB	00000000		CCN	0	008760
624	00BC	00000000		CCN	0	008770
625	00BD	00000000		CCN	0	008780
626	00BE	00000000		CCN	0	008790
627	00BF	00000000		CCN	0	008800
628	00C0	00000000		CCN	0	008810
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631	00C3	00000000		CCN	0	008840
632	00C4	00000000		CCN	0	008850
633	00C5	00000000		CCN	0	008860
634	00C6	00000000		CCN	0	008870
635	00C7	00000000		CCN	0	008880
636	00C8	00000000		CCN	0	008890
637	00C9	00000000		CCN	0	008900
638	00CA	00000000		CCN	0	008910
639	00CB	00000000		CCN	0	008920
640	00CC	00000000		CCN	0	008930
641	00CD	00000000		CCN	0	008940
642	00CE	00000000		CCN	0	008950
643	00CF	00000000		CCN	0	008960
644	00D0	00000000		CCN	0	008970
645	00D1	00000000		CCN	0	008980
646	00D2	00000000		CCN	0	008990
647	00D3	00000000		CCN	0	009000
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653	00D9	00000000		CCN	0	009060
654	00DA	00000000		CCN	0	009070
655	00DB	00000000		CCN	0	009080
656	00DC	00000000		CCN	0	009090
657	00DD	00000000		CCN	0	009100
658	00DE	00000000		CCN	0	009110
659	00DF	00000000		CCN	0	009120
660	00E0	00000000		CCN	0	009130
661	00E1	00000000		CCN	0	009140
662	00E2	00000000		CCN	0	009150
663	00E3	00000000		CCN	0	009160
664	00E4	00000000		CCN	0	009170
665	00E5	00000000		CCN	0	009180
666	00E6	00000000		CCN	0	009190
667	00E7	00000000		CCN	0	009200
668	00E8	00000000		CCN	0	009210
669	00E9	00000000		CCN	0	009220
670	00EA	00000000		CCN	0	009230
671	00EB	00000000		CCN	0	009240
672	00EC	00000000		CCN	0	009250
673	00ED	00000000		CCN	0	009260
674	00EE	00000000		CCN	0	009270
675	00EF	00000000		CCN	0	009280
676	00F0	00000000		CCN	0	009290
677	00F1	00000000		CCN	0	009300
678	00F2	00000000		CCN	0	009310
679	00F3	00000000		CCN	0	009320
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681	00F5	00000000		CCN	0	009340
682	00F6	00000000		CCN	0	009350
683	00F7	00000000		CCN	0	009360
684	00F8	00000000		CCN	0	009370
685	00F9	00000000		CCN	0	009380
686	00FA	00000000		CCN	0	009390
687	00FB	00000000		CCN	0	009400
688	00FC	00000000		CCN	0	009410
689	00FD	00000000		CCN	0	009420
690	00FE	00000000		CCN	0	009430
691	00FF	00000000		CCN	0	009440
692	0100	00000000		CCN	0	009450
693	0101	00000000		CCN	0	009460
694	0102	00000000		CCN	0	009470
695	0103	00000000		CCN	0	009480
696	0104	00000000		CCN	0	009490
697	0105	00000000		CCN	0	009500
698	0106	00000000		CCN	0	009510
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700	0108	00000000		CCN	0	009530
701	0109	00000000		CCN	0	009540
702	010A	00000000		CCN	0	009550
703	010B	00000000		CCN	0	009560
704	010C	00000000		CCN	0	009570
705	010D	00000000		CCN	0	009580
706	010E	00000000		CCN	0	009590
707	010F	00000000		CCN	0	009600
708	0110	00000000		CCN	0	009610
709	0111	00000000		CCN	0	009620
710	0112	00000000		CCN	0	009630
711	0113	00000000		CCN	0	009640
712	0114	00000000		CCN	0	009650
713	0115	00000000		CCN	0	009660
714	0116	00000000		CCN	0	009670
715	0117	00000000		CCN	0	009680
716	0118	00000000		CCN	0	009690
717	0119	00000000		CCN	0	009700
718	011A	00000000		CCN	0	009710
719	011B	00000000		CCN	0	009720
720	011C	00000000		CCN	0	009730
721	011D	00000000		CCN	0	009740
722	011E	00000000		CCN	0	009750
723	011F	00000000		CCN	0	009760
724	0120	00000000		CCN	0	009770
725	0121	00000000		CCN	0	009780
726	0122	00000000		CCN	0	009790
727	0123	00000000		CCN	0	009800
728	0124	00000000		CCN	0	009810
729	0125	00000000		CCN	0	009820
730	0126	00000000		CCN	0	009830
731	0127	00000000		CCN	0	009840
732	0128	00000000		CCN	0	009850
733	0129	00000000		CCN	0	009860
734	012A	00000000		CCN	0	009870
735	012B	00000000		CCN	0	009880
736	012C	00000000		CCN	0	009890
737	012D	00000000		CCN	0	009900
738	012E	00000000		CCN	0	009910
739	012F	00000000		CCN	0	009920
740	0130	00000000		CCN	0	009930
741	0131	00000000		CCN	0	009940
742	0132	00000000		CCN	0	009950
743	0133	00000000		CCN	0	009960
744	0134	00000000		CCN	0	009970
745	0135	00000000		CCN	0	009980
746	0136	00000000		CCN	0	009990
747	0137	00000000		CCN	0	010000
748	0138	00000000		CCN	0	010010
749	0139	00000000		CCN	0	010020
750	013A	00000000		CCN	0	010030
751	013B	00000000		CCN	0	010040
752	013C	00000000		CCN	0	010050
753	013D	00000000		CCN	0	010060
754	013E	00000000		CCN	0	010070
755	013F	00000000		CCN	0	010080
756	0140	00000000		CCN	0	010090
757	0141	00000000		CCN	0	010100
758	0142	00000000		CCN	0	010110
759	0143	00000000		CCN	0	010120
760	0144	00000000		CCN	0	010130
761	0145	00000000		CCN	0	010140
762	0146	00000000		CCN		

MOD 36		05/18/76		AN/BRN-7		PAGE 26
620	008E	00000000	VC2	COND	0	008880
621	008F		VC3	EQU	VC2+1	008890
622	00C0	00000000	THETA_P	COND	0	008900
623	00C2	0000	PSI_A	CON	0	008910
624	00C3	0000	CONNIE_LIMIT:	CON	0	008920
625						008930
626						008940
627						008950
628						008960
629						008970
630						008980
631						008990
632						009000
633						009010
634						009020
						009030
						009040
						009050
						009060
						009070
						009080
						009090

END WORDS PICKED UP BY C I PROG

REQD = 0 FOR PHASE DIFFERENCE
OTHERWISE IT FORCES RHO RHO

670
671

MOD	36	05/18/76	AM/BRN-7	STATION_VECTOR_TABLE	PAGE 28
	SV_ADD		CON	XXX	009530
	XXI_ADD		CON		009540
	*				009550
	*				009560
	*				009570
	*				009580
	*				009590

00FE 1798
00FF ICIE

END EXTENDED ADDRESSING

704	0110	DCAYL_TABLE	CON	ORG	X(0110)	PP010000
705	0110	0000	CON		0	PP010000
706	0111	68FD	CON		F((160.9)*.9974)*217.021860-6)	13.6PP010010
707	0112	3532	CON		F((130.0)*.9974)*217.021860-6)	11.3PP010020
708	0113	068D	CON		F((103.8)*.9974)*217.021860-6)	PP010030
709	0114	6187	CON		F((155.0)*.9974)*217.021860-6)	PP010040
710	0115	3201	CON		F((128.2)*.9974)*217.021860-6)	PP010050
711	0116	0F88	CON		F((108.3)*.9974)*217.021860-6)	PP010060
712	0117	4445	CON		F((138.5)*.9974)*217.021860-6)	PP010070
713	0118	2598	CON		F((121.2)*.9974)*217.021860-6)	PP010080
714	0119	09C1	CON		F((105.5)*.9974)*217.021860-6)	PP010090
715	011A	1547	CON		F((112.0)*.9974)*217.021860-6)	PP010100
716	0118	09C1	CON		F((105.5)*.9974)*217.021860-6)	PP010110
717	011C	2788	CON		F((122.3)*.9974)*217.021860-6)	PP010120
718	011D	1AF4	CON		F((115.2)*.9974)*217.021860-6)	PP010130
719	011E	2266	CON		F((119.4)*.9974)*217.021860-6)	PP010140
720	011F	2EA3	CON		F((126.3)*.9974)*217.021860-6)	PP010150
721	0120	220C	CON		F((119.2)*.9974)*217.021860-6)	PP010160
722	0121	2951	CON		F((123.3)*.9974)*217.021860-6)	PP010170
723	0122	358D	CON		F((130.2)*.9974)*217.021860-6)	PP010180
724	0123	2951	CON		F((123.3)*.9974)*217.021860-6)	PP010190
725	0124	2FE0	CON		F((127.0)*.9974)*217.021860-6)	PP010200
726	0125	3A29	CON		F((132.8)*.9974)*217.021860-6)	PP010210
727	0126	2CAF	CON		F((125.2)*.9974)*217.021860-6)	PP010220
728	0127	344F	CON		F((129.5)*.9974)*217.021860-6)	PP010230
729	0128	38EF	CON		F((133.8)*.9974)*217.021860-6)	PP010240
730	0129	2CAF	CON		F((125.2)*.9974)*217.021860-6)	PP010250
731	012A	3532	CON		F((130.0)*.9974)*217.021860-6)	PP010260
732	012B	3CA5	CON		F((134.2)*.9974)*217.021860-6)	PP010270
733	012C	2CAF	CON		F((125.2)*.9974)*217.021860-6)	PP010280
734	012D	358D	CON		F((130.2)*.9974)*217.021860-6)	PP010290
735	012E	3894	CON		F((133.6)*.9974)*217.021860-6)	PP010300
736	012F	2CAF	CON		F((125.2)*.9974)*217.021860-6)	PP010310
737	0130	3532	CON		F((130.0)*.9974)*217.021860-6)	PP010320
738	0131	3ADF	CON		F((133.2)*.9974)*217.021860-6)	PP010330
739	0132	2844	CON		F((124.4)*.9974)*217.021860-6)	PP010340
740	0133	3422	CON		F((129.4)*.9974)*217.021860-6)	PP010350
741	0134	3A57	CON		F((132.9)*.9974)*217.021860-6)	PP010360
742	0135	2A06	CON		F((123.7)*.9974)*217.021860-6)	PP010370
743	0136	323F	CON		F((128.9)*.9974)*217.021860-6)	PP010380
744	0137	39CF	CON		F((132.6)*.9974)*217.021860-6)	PP010390

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PAGE 31
PP010400
PP010410
PP010420
PP010430
PP010440
PP010450
PP010460
PP010470

F(((23.7)*.9974)*217.0218 6D-6)
F(((28.8)*.9974)*217.0218 6D-6)
F(((32.1)*.9974)*217.0218 6D-6)
F(((23.7)*.9974)*217.0218 6D-6)
F(((28.5)*.9974)*217.0218 6D-6)
F(((31.8)*.9974)*217.0218 6D-6)
F(((23.7)*.9974)*217.0218 6D-6)
F(((27.6)*.9974)*217.0218 6D-6)

CON
CON
CON
CON
CON
CON
CON
CON

0138 2A06
0139 3312
013A 38EC
013B 2A06
013C 3289
013D 3863
013E 2A06
013F 30F1

745
746
747
748
749
750
751
752

PAGE 33
EX010910
EX010920
EX010930
EX010940
EX010950
EX010960

MOD 36 05/18/76 AN/BRN-7

X (8000)
X (8601)
X (C412)
X (D013)
X (0308)
X (0400)

CCN
CCN
CCN
CCN
CCN
CCN

0158 8000
015C 8601
015D C412
015E D013
015F 0308
0160 0400

773
774
775
776
777
778

EX010970

EX010980

066010X3

EX011000

010110X3

EX011020

EX011030

011040

011050

011060

011070

011080

060110

001110

011110

011120

06171044

0471710H*

*4011150

#4011160

*1011170

081110X3

061110X3

EX011200

EX011210

02211057

TITLE CHARACTERS O=F = 0-F G=10 H=11 I=12 J=13 K=14 L=15 M=16 N=17
O=18 P=19 Q=1A R=1B S=1C T=1D U=1E V=1F W=20 X=21 Y=22 Z=23 -=24
.=25 / =26 ==27 (=28)=29 @=2A ,=2B *-2C &=2D BLANK=2E

[illegible]

POWER OFF INTERRUPTS FORCE ENTRY TO THIS ROUTINE

```

* OFF                                "STOP INTERRUPTS SO THAT THIS
LGC                                INTERRUPT_INHIBIT "ROUTINE IS NOT INTERRUPTED
CLA                                0, OFF_COUNT "INCREMENT COUNT OF NUMBER OF
ADD                                0, 1 "POWER OFF INTERRUPTS
STA                                0, OFF_COUNT
HLT                                "STOP COMPUTER"

```

780	28
781	8
782	10
783	18
784	22

```

**
**      MAIN PROGRAM
**      * THIS ROUTINE IS THE LOWEST LEVEL ROUTINE
**      * IN THE SYSTEM. IT IS ENTERED BY THE POWER
**      * ON INTERRUPT OR WHENEVER A DECISION IS
**      * MADE TO RESTART. THIS ROUTINE PERFORMS
**      * INITIALIZATION, ENABLES DMA AND INTERRUPTS,
**      * ENTERS THE SYNC COMPUTATIONAL ROUTINE AND
**      * DOES CHECKSUM. IT ONLY OPERATES WHEN THERE
**      * ARE NO OMEGA OR NON OMEGA TASKS REMAINING.
**      BEGIN      CLAM      15,ROLL_14  "INITIALIZE R14 AND R15 TO POINT
**      *           CLAM      "TO THE TOP OF THE R14 AND R15
**      *           CLAM      "PUSHDOWN STACKS
**      *           CLAM      "TURN ON PROTECT IN CASE PROGRAM
**      *           SET       0,,ENABLE_MEMORY_PROTECT "MONITOR IS AVAILABLE
**      *           FET       1,,DB_PCHAD "SET UP TO ENTER DEBUG IN SUCH A
**      *           *         "WAY THAT IT WILL READ THE INPUT
**      *           *         "WORD ON THE FIRST ENTRY WITHOUT
**      *           *         "WAITING FOR A BUTTON TO BE
**      *           *         "DEPRESSED. THIS WILL ALLOW THE
**      *           *         "OPERATOR TO 'HOLD' THE PROGRAM
**      *           *         "FROM THE PMU AT TURN ON.
**      *           FET       7,,DB_MODE "DEB - AUTOMATIC RETURN IF NO
**      *           *         OMEGA_DEBUG$2 "PROGRAM MONITOR UNIT AVAILABLE
**      *           *         CLAD      0,,TIME "ADD VALUE OF COMPUTER TIME
**      *           *         MPYD      0,,=DF(5D-3931/24/3600/1811) 11
**      *           *         "TURN OFF TO GMT
**      *           *         ADDD      0,,DAY_SINCE_JAN1_1972 "OF PREVIOUS TURN ON TO
**      *           *         STAD      0,,DAY_SINCE_JAN1_1972 "GET TIME OF THIS TURN ON
**      *           *         " (WHICH THE OPERATOR CAN REJECT)
**      *           *         SUBD      1,1 "CLEAR LOWER MEMORY FROM ZERO UP
**      *           *         CLAM      3,,TIME+1 "TO AND INCLUDING TIME LOCATION
**      *           *         STA      11,2 "
**      *           *         BXU      2,,$1 "
**      *           *         CLAM      2,,ROLL+5 "CLEAR UPPER MEMORY FROM THE
**      *           *         CLAM      3,,PANEL_DATA-1 "BOTTOM OF THE R15 PUSHDOWN STACK
**      *           *         STA      11,2 "UPTO PANEL DATA LOCATION
**      *           *         BXU      2,,$2 "
**      *           *         CLAM      1,,X(4A00) "TURN ON THE INSERT, DISPLAY,

```

```

EX011230
*H011240
*H011250
*H011260
*H011270
*H011280
*H011290
*H011300
*H011310
*H011320
EX011330
EX011340
EX011350
*H011360
EX011370
EX011380
EX011390
EX011400
EX011410
EX011420
EX011430
EX011440
*H011450
EX011460
EX011470
EX011480
EX011490
EX011500
EX011510
EX011520
EX011530
EX011540
EX011550
EX011560
EX011570
EX011580
EX011590
EX011600
EX011610
EX011620
EX011630
EX011640
EX011650

```


MOD	36	05/18/76	AN/BRN-7	PAGE	36
804	6	0183	9C23	CLAM	2,,X(0003)
805	10	0184	FC39E000	CLAM	3,,X(E000)
806	20	0186	FC170009	STA	1,,C,I,OUTPUT_LAMPS_MISCELLANEOUS_SWITCHES
807	32	0188	F8271F48	STAD	2,,PANELMODE+1
					"SET PANEL SWITCH MASK SO THAT
					"DEPRESSING THE ILLUMINATED
					"BUTTONS IS VALID
808	46	018A	F80C0156	DISPLAY	PROGRAM ID ON PANEL
809	68	018C	F03C014F	FETD	0,,PROG_ID,DB
810	70	018E	8445	FET	3,,PROGRAM_ID
811	72	018F	A424	ADD	4,5
812	2R	0190	583A	CLA	2,4
813	6	0191	D054	COMM	3,,10
814	2R	0192	503A	BRL	\$21
815	6	0193	F4250010	SUBM	3,,10
816	10	0195	D806	ADDH	2,,16
817	2R	0196	8423	BUC	\$11
818	4	0197	A431	ADD	2,3
819	8	0198	F4340100	CLA	3,1
820	18	019A	FC4A00DC	LSA	3,,8
821	48	019C	F4570003	CLAD	4,,HX0080
822	56	019E	8410	PTR	5,,C,_LEFT_DISPLAY
823	60	019F	FC094135	FETM	1,,0
824	2R	01A1	9001	CLAM	0,,X(4135)
825	6	01A2	D812	SUBM	0,1
				BNE	\$3
					ADJUST.
					"SET 1ST OMEGA TASK = PREFLIGHT
826	70R	01A3	0808	OMEGA	TEST1-OMEGA_TASK_TABLE/2
					"TO OCCUR IN 50 MSEC
827	78	01A4	310A	SET	INITIALIZE PRECISION FREQUENCY
828	82	01A5	FC090300	CLAM	RESET_PFG_COUNTDOWN
					"GENERATOR IN RECEIVER
829	84	01A7	DF61	LGC	ALLOW DIRECT MEMORY ACCESS I/O
					"TO OCCUR (INHIBIT NOT TRUE)
830	86	01A8	DF60	LGC	ALLOW INTERRUPTS TO OCCUR IN THE
831	96	01A9	F0070023	STA	INTERRUPT_INHIBIT+E
					"1070 (INHIBIT NOT TRUE)
					0,,OUTPUT_TEST_AND_MISCELLANEOUS_SIGNALS
					"SET COMPUTER AND SYSTEM OK BITS
					"IN TEST SIGNAL OUTPUT WORD
					"100 MILLISECOND MONITOR SIGNAL
832	104	01AB	030C	SET	PROGRAM_SEQUENCING
833	112	01AC	F80F8CC3	LOC	"FOR HALF INDICATOR
					0,,PROGRAMMER_CONTROLLER_GO_LIGHT

834	122	Q1AE	FC000150	MOD 36	05/18/76	AM/BN-7	PCP	0,,PROGRAM_10+1	'GO' & MOD	# ON P/C	PAGE 37
				*				THE 5 MSEC OMEGA INTERRUPT WILL BE			*012090
				*				ENABLED AFTER ONE PASS THROUGH			*012100
				*				CHECKSUM. THIS ROUTINE WILL CYCLE			*012110
				*				THROUGH CHECKSUM REPEATEDLY (EXCEPT			*012120
				*				WHEN DOING SYNC CALCULATIONS) WHEN			*012130
				*				THERE ARE NO OTHER PROCESSING REQUIREMENTS			*012140
				*							*012150
				*							EX012160
				*				"CHECKSUM PROGRAM AREA OF MEMORY			*1012170
835	AR *	0180	F8000243					"INDICATE HALF IF NOT CORRECT			EX012180
836	14	0182	9E09 (0089)				BSV	0,,TEN_SECOND_SYNC_PERIOD+COMPLETE_MARKER			*012190
				*			CLA	"HAS A SYNC 10			*012200
837	18	0183	0864 (0180)				BRE	"SEC DATA COLLECTION PERIOD JUST			*012210
				*				"ENDED?			EX012220
				*				PERFORM SYNC COMPUTATIONS			*012230
				*				RETURN TO TEST SYNC IF NOT COMPLETE			*012240
				*				CONTINUE CN IF SYNC IS COMPLETE			*012250

SY012260

#H012270

#H012280

#H012290

#H012300

#H012310

#H012320

SY012330

SY012340

#SY012350

SY012360

SY012370

SY012380

SY012390

SY012400

SY012410

SY012420

#SY012430

SY012440

SY012450

SY012460

SY012470

SY012480

#SY012490

#SY012500

#SY012510

SY012520

#SY012530

SY012540

SY012550

SY012560

SY012570

SY012580

SY012590

SY012600

SY012610

SY012620

SY012630

SY012640

#SY012650

SY012660

SY012670

#SY012680

SYNC CALCULATIONS

THIS PROGRAM IS ENTERED AFTER THE SYNC DATA COLLECTION ROUTINE
 HAS COLLECTED DATA FOR TEN SECONDS. IT WILL PROCESS THE DATA AND
 DECIDE IF SYNC IS COMPLETE.

```

838      2R      01B4 9C00      SYNC_CALC      CLAM      0,0      "RESET SYNC TEN SECOND MARKER"
839      10      01B5 70C9 (0089)      STA      0,,TEN_SECOND_SYNC_PERIOD_COMPLETE_MARKER
840      14      01B6 FC7900C8      CLAM      7,,200      "INITIALIZATION"
841      16      01B8 A487      CLA      8,7      "SET C(100) = -.5"
842      18      01B9 A497      CLA      9,7      "SET POINTERS TO THE 4 LARGEST"
843      20      01BA A4A7      CLA      10,7      "C(1) = C(100)"
844      30      01BB FCOA1A7A      CLAD      0,,=DF(-1B-1)      LOCATION
845      34      01BD FC891DAE      CLAM      11,,SYNC_C
846      44      01BF 7878      STAD      1X7,11
847      48      01C0 FC4900C6      CLAM      4,,198
848      50      01C2 9C30      CLAM      3,0      "SET UP INDEX FOR I (0 TO 198)"
849      52      01C3 9C50      CLAM      5,0      "BY 2'S FOR THE 100 C'S (0 TO 99)"
850      54      01C4 9C6E      CLAM      6,14      "SET UP INDEX FOR K (0 TO 14)"
851      6R      01C5 8400      FETM      0,,0      "BY 2'S FOR THE 8 STATIONS"
852      10      01C6 B822      SUBD      2,2      "START C(1) COMPUTATION"
853      2R      01C7 A406      CLA      0,6      "SET SUMMATION = 0"
854      8      01C8 9208 (0088)      SUB      0,,SYNC_FREQUENCY      "COMBINE K AND FREQ (MOD 8) TO"
855      14      01C9 F0044000      RSA      0,,1      "FIND OUT WHICH STATION IS NEXT"
856      18      01CB D021 (01CD)      RGE      $1      "STATION = A FOR K = 0 AND 10.2)"
857      2R      01CC 9408      ADDM      0,8      "SYNCHRONIZATION"
858      8R      01CD F50A00D5      CLA      X0,,POWERS_OF_TWO
859      16      01CF E40000E5      EXT      0,0,STATIONS_IN_USE
860      20      01D1 D06C (01DE)      BRE      $2

      *      "IS THIS A USABLE STATION?"
      *      "READ START TIME AND BURST"
      *      "TIME FOR THIS STATION. ALL"
      *      "TIMES ARE RELATIVE TO START OF"
      *      "STATION A 10.2 AND IN UNITS OF"
      *      "TABLE ".05 SEC (THEREFORE THE STATION"
      *      "TIME IS A NUMBER BETWEEN 0 AND"
      *      "158 AND MATCHES THE INDEX I)."
      *      "BURST TIME IS THE NUMBER OF .1"
      *      "SEC INTERVALS IN A STATION BURST"
      *      "COMPUTE SUM OVER BURST FOR THIS"
      *      "SUBROUTINE "STATION"
      *      "ADD SHORT SUM TO C(1)"
      *      "INCREASE NUMBER OF .1 SEC

861      10R      01D2 F06A16DE      CLAD      X6,,SYNC_LIMIT

862      18 *      01D4 F8000268      BSV      SYNC_SUMMATION
863      22      01D6 8C40      ADDD      4,0
864      32      01D7 D710      PAN      1

```


	MOD	36	05/18/76	AN/BRN-7		1,4	PAGE 33
865	34	0108	9414	ADDM			"INTERVALS BY 4 AND LOWER THE
866	36	0109	9004	SUBM			"START TIME BY 2 .1 SEC INTERVALS
	*						"TO INCLUDE SLOTS BEFORE AND
	*						"AFTER BURST IN NEXT SUM.
	*						"COMPUTE SUM OVER BURST + SLOTS
867	44 *	01DA	F80D0268	BSV			"FOR THIS STATION
868	48	01DC	8840	SUBD			"SUBTRACT LONG SUM FROM C(I)
869	58	01DD	D710	PRN			"INCREMENT K BY 2
	*						"ARE THERE MORE STATIONS FOR
870	8R	01DE	CD68	EXUD			"THIS C(I)?
	*						"AVERAGE C(I) WITH OLD C(I)"
871	2R	01DF	A412	CLA			"AVERAGE = (C(I) - C(OLD))/N
872	4	01E0	A423	CLA			"WHERE N = NUMBER OF TEN SECOND
873	12	01E1	D700	PRN			"INTERVALS PROCESSED
874	20	01E2	B838	SUBD			C 825
875	38	01E3	4285	MPYD			R0 = KLK, C(I)
876	46	01E4	BF38	ADDD			R1 = KUK - KLK + 1
877	56	01E5	7B38	STA0			R2 = TEMP (SUM)
	*						R3 = I
	*						R4 = I END
	*						R5 = K
	*						R6 = K END
	*						R7 = I 4TH LARGEST
	*						R8 = I 3RD LARGEST
	*						R9 = I 2ND LARGEST
	*						RA = I 1ST LARGEST
	*						RB = SYNC C ADDRESS
	*						RC = SPARE
	*						RO = TEMP(FIRST SUM)
	*						
	*						NOW DETERMINE IF THIS C(I) IS ONE
	*						OF THE FOUR LARGEST C(I)'S COMPUTED
	*						SC FAR
878	64	01E6	887B	COMD			IX7,11
	*						"IS THIS C(I)
879	68	01E7	D050	BRL			"LARGER THAN THE FOURTH LARGEST?
880	2R	01E8	A473	CLA			"PUT I INTO 4TH LARGEST POINTER
881	10	01E9	888B	COMD			"IS THIS C(I)

MOD	36	05/18/76	AM/BRN-7	PAGE	40
882	14	Q1EA D05A	BRL	\$4	"LARGER THAN THE THIRD LARGEST?"
883	2R	Q1EB A478	CLA	7,8	"MOVE OLD THIRD POINTER TO 4TH
884	4	Q1EC A483	CLA	8,3	"AND PUT 1 INTO 3RD LARGEST
885	12	Q1ED 8898	COMD	IX9,11	"POINTER
886	16	Q1EE D056	BRL	\$4	"IS THIS C(I)
887	2R	Q1EF A489	CLA	8,9	"LARGER THAN THE SECOND LARGEST?"
888	4	Q1F0 A493	CLA	9,3	"MOVE OLD SECOND POINTER TO 3RD
889	12	Q1F1 88A8	COMD	IX10,11	"AND PUT 1 INTO 2ND LARGEST
890	16	Q1F2 D052	BRL	\$4	"POINTER
891	2R	Q1F3 A49A	CLA	9,10	"IS THIS C(I) THE LARGEST C(I)?"
892	4	Q1F4 A4A3	CLA	10,3	"MOVE OLD 1ST POINTER TO 2ND AND
					"PUT 1 INTO THE LARGEST POINTER
					"I = I+2
893	8R	Q1F5 CF31	BXUD	3,,\$33	"ARE THERE MORE C(I)'S TO
					"COMPUTE?"
					"NOW USE THE FOUR LARGEST C(I)'S TO
					"DETERMINE IF SYNCHRONIZATION HAS BEEN
					"OBTAINED AND, IF SO, COMPUTE SYNC TIME
					"DETERMINE IF SYNC IS COMPLETE
894	8R	Q1F6 AFAB	CLAD	IX10,11	"COMPUTE CONFIDENCE LEVEL" C
895	28	Q1F7 F8061A7C	MPYD	0,,\$DF((.15)*2)	"C = (.3*C(1ST) + .036**4*240*240)
896	38	Q1F9 FC081A7E	ADD	0,,\$DF((.036*16*240*240*28-25/2)	
897	50	Q1F8 8685	FETD	0,,\$SYNC_10VERN	
898	496	Q1FC 1000	SQRT	0	
899	512	Q1FD 6820	MPYD	2,0	CONFIDENCE LEVEL B25
900	524	Q1FE F8071ED5	STAD	0,,\$Q_STORAGE+2	"SAVE 1/N**5 FOR SYNC DISPLAY
					"THAT DISPLAY IS 0 IF C(1ST) IS
901	536	Q200 F8271ED7	STAD	2,,\$Q_STORAGE+4	"LESS THAN ZERO
902	544	Q202 AFCD	CLAD	IX12,13	"SAVE C FOR SYNC DISPLAY
903	554	Q203 D710	PRN	1	LARGEST MUST BE +
904	560	Q204 Q4050180	BRL	TEST_SYNC	"IS C(1ST) MINUS?"
905	8R	Q206 88A8	SUBD	IX10,11	"(COLLECT MORE DATA IF YES)
906	12	Q207 A800	CLSD	0,0	"FORM (C(1ST) - C(2ND)) - C
907	20	Q208 8898	SUBD	IX9,11	CIST - CD
908	32	Q209 F8071ED5	STAD	0,,\$Q_STORAGE+2	COM WITH SEC
					"AND SAVE FOR SYNC DISPLAY
					"IS C(1ST)-C(2ND)
909	36	Q208 D231	BRG	\$10	"GREATER THAN C? (SYNC COMPLETE
					"IF YES)
					"THERE IS STILL A POSSIBILITY THAT

[illegible]

936	6	022E D004 (0233)	BUC	\$16	"I(1ST) DEFINES START OF STATION	SY013980
937	2R	022F A41A	CLA	1,10	"A 10.2 BURST	SY013990
938	4	0230 B419	ADD	1,9	"SYNC COMPLETE"	SY014000
					"C(1ST) AND C(2ND) ARE ADJACENT	SY014010
					"USE ((11ST) + I(2ND))/2 TO	SY014020
					"DEFINE START OF STATION A	SY014030
939	10	0231 F0144000	RSA	1,1	"10.2 BURST	SY014040
940	4R	0233 441A	MPIM	1,10	"MULTIPLY I BY 10 TO GET STATION	SY014050
					"A 10.2 BURST TIME WITH RESOLU-	SY014060
					"TION OF 5 MSEC. THE EFFECTIVE	SY014070
					"RESOLUTION IS THE .1 SEC INTER-	SY014080
					"VAL OVER 2 (OR 50 MSEC)	SY014090
941	2R	0234 9C00	CLAM	0,0	"ADD START SYNC TIME TO GET TIME	% 014100
					"OF STATION A 10.2 BURST IN	SY014110
942	10	0235 9688 (0088)	ADD0	0,,START_SYNC_TIME	"REAL TIME (COMPUTER TIME) IT	SY014120
					"THE BURST THAT OCCURRED DURING	SY014130
943	20	0236 7808 (0088)	STAD	0,,START_SYNC_TIME	"THE FIRST SYNC 10 SEC PERIOD	SY014140
					"SET OMEGA TIME = 0 TO STOP SYNC	SY014150
944	24	0237 B800	SUBD	0,0	"DATA COLLECTION PROGRAM	SY014160
945	34	0238 7817 (0097)	STAD	0,,OMEGA_TIME	"SHOULD BE LARGE NUMBER IN OMEGA	SY014170
					"TIME TO STOP OMEGA PROGRAMS	SY014180
946	4R	0239 FC290205	CLAM	2,,PHI_ZERO_SYNC_DATA COMPUTE NUMBER WORDS	"CLEAR THE SYNC DATA STORAGE AREAS	SY014190
					"FOR USE BY OTHER PROGRAMS	SY014200
947	14	0238 F1171C1E	STA	X1,,SYNC_DATA	"SET THE 'START OMEGA' MARKER TO	SY014210
948	22	0230 C415 (0239)	BXU	1,,\$11	"TELL THE START OMEGA PROGRAM	SY014220
949	2R	023E 9C01	CLAM	0,,1	"TO BEGIN OMEGA NAVIGATION	SY014230
					"SET THE 'START OMEGA' MARKER TO	% 014240
950	10	023F 701C (009C)	STA	0,,START_OMEGA_NOW	"TELL THE START OMEGA PROGRAM	% 014250
					"TO BEGIN OMEGA NAVIGATION	SY014260
						SY014270
						SY014280
						SY014290
						SY014300
						EX014310
						*H014320

* SEQUENCE TO THE LAST PART OF MAIN PROGRAM

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PAGE 43

EX014330

EX014340

EX014350

*1014360

EX014370

EX014380

EX014390

* MAIN PROGRAM - CONTINUOUS CHECKSUM TEST

* PMU DATA-ERROR LIGHT SET ON FAIL, RESET ON PASS

* "CHECKSUM PROGRAM AREA OF MEMORY

MAIN_PROGRAM:

BSV

BUC

8R *

12

Q240 F80D0243

Q242 D803 (0240)

MP_CKSUM

MAIN_PROGRAM

"INDICATE HALF IF NOT CORRECT

"LOOP ON CHECKSUM"

951

951

952

**
 * MEMORY CHECKSUM - SUM ALL WORDS OF
 * MEMORY EXCEPT VARIABLE STORAGE
 * RESULT SHOULD BE ZERO

MP_CKSUM	FETD	FETM	0,,CKSUM_LINK
\$1	ADD	1,,1	1,,1
	BRE	10,,2	10,,2
	COM	2,,\$1	2,,\$1
	BNE	\$3	\$3
	STA	1,,DB_CKSUM_IGNORE MRKR=1 MEANS DB WRITE MADE	1,,DB_CKSUM_IGNORE MRKR=1 MEANS DB WRITE MADE
	BUC	\$4	\$4
\$3	CLAM	0,,0	0,,0
	STA	0,,DB_CKSUM_IGNORE ALWAYS ZERO DB MRKR	0,,DB_CKSUM_IGNORE ALWAYS ZERO DB MRKR
\$4	BUC	\$2	\$2
	MARK	10,,HX0080	10,,HX0080
	CLAM	0,,0	0,,0
	MKG	0,,ERROR	0,,ERROR
\$2	FET	0,,1,PMU_INDICATOR_WORD	0,,1,PMU_INDICATOR_WORD
	FAIL	0,,HX0900	0,,HX0900
	B8K	10,,HX0800	10,,HX0800
		3	3

EX014400
 #H014410
 #H014420
 #H014430
 EX014440
 EX014450
 EX014460
 EX014470
 EX014480
 TS014490
 TS014500
 TS014510
 014520
 014530
 TS014540
 TS014550
 EX014560
 EX014570
 EX014580
 EX014590
 EX014600

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PAGE 45

TS014610

#H014620

#H014630

#H014640

#H014650

#H014660

TS014670

TS014680

EX014690

EX014700

TS014710

#H014720

#H014730

#H014740

#H014750

#H014760

#H014770

EX014780

EX014790

EX014800

TS014810

014820

014830

014840

014850

014860

014870

FAIL

* THIS PIN ROUTINE POSTS BITS IN THE
* TEST SIGNAL OUTPUT WORD. THE BITS ARE
* IN RO AND THE MASK IS IN RI

0,1,OUTPUT_TEST_AND_MISCELLANEOUS_SIGNALS
"MERGE BITS INTO TEST SIGNAL
"OUTPUT WORD

1

MARK

* THIS PIN ROUTINE WILL SET BITS IN A TEST
* FAIL WORD GIVEN THE BIT NUMBER IN RO

X0,POWERS_OF_TWO "READ BIT FROM POWERS OF TWO
0,0,TEST_FAIL "TABLE AND MERGE INTO TEST FAIL
0,0,TEST_FAIL_TEMP "AND TEST FAIL TEMP WORDS
0

PRN'S 1 OFF

TURN ON SYSTEM FAIL LIGHT
ONLY

IO,HX0100

0,0,TEST_FAIL+1

0,0,TEST_FAIL_TEMP+1

0

FAIL_EXTERNAL;

FAILD

MRG

MRG

B8K

2EDD (0000)

EG000002

EG00002F

D500

18R *

12R

24

36

976

977

978

979

0258 E0010023

025A D510

12R

26

0258 F50A00D5

025D E0000001

025F E000002E

0261 D500

8R

20

32

44

972

973

974

975

** SYNC SUMMATION ROUTINE

* THIS ROUTINE IS USED BY THE SYNC COMPUTATIONAL
 * PROGRAM TO FORM THE SUMMATION OF THE SINE'S
 * AND COSINE'S OVER THE INTERVAL SPECIFIED BY
 * THE ARGUMENTS. THE ARGUMENTS CONSIST OF THE
 * NUMBER OF TERMS, NUMBER OF THE FIRST TERM
 * (ASSUMING 1=0) AND THE CURRENT VALUE OF I. THE
 * ARGUMENTS ARE NOT DISTURBED AND THE RESULT IS
 * LEFT IN REGISTERS ADDED BY THIS ROUTINE.

SYNC_SUMMATION_SUBROUTINE:

980	20R	0268	8470	FETM	7,0	"CLEAR SUM COS AND SUM SIN	SY014880
981	22	0269	A459	CLA	5,9	"MOVE NUMBER OF TERMS AND	SY014890
982	24	026A	A408	CLA	0,8	"START POINT	SY014900
983	28	026B	D021 (026D)	BGE	\$1	"IS THE START	SY014910
						"POINT IN PROPER RANGE?	SY014920
						"(0 TO 198 BY 2)	SY014930
984	6R	026C	9679 (00F9)	ADD	0, HD200	"PUT START POINT INTO RANGE	SY014950
985	2R	026D	B40C	ADD	0, 12	"BY ADDING 200	SY014960
986	10	026E	F41A0087	CLA	1, SYNC_DATA_ADDRESS	"FORM START POINT + 1	SY014970
987	12	0270	B401	ADD	0, 1	"DATA FOR THIS 10 SEC PERIOD AND	SY014980
988	16	0271	F41900C8	ADD	1, 200	"ADD TO CURRENT START POINT	SY014990
989	2R	0273	8001	CCM	0, 1	"FORM BASE ADDRESS + 200 = UPPER	SY015000
						"LIMIT OF DATA STORAGE AREA	SY015010
						"POINTER TO NEXT DATA WORD IS NOW	SY015020
						"AVAILABLE FOR SUM'S	SY015030
						"IS THE DATA	SY015040
990	6	0274	D051 (0276)	BRL	\$2	"POINTER LESS THAN THE DATA UPPER	SY015050
						"LIMIT?	SY015060
991	6R	0275	9279 (00F9)	SUB	0, HD200	"FORM POINTER - 200 TO PUT IT IN	SY015070
						"THE PROPER RANGE	SY015080
992	6R	0276	8620	ADD	12, 0	"USE DATA POINTER TO SUM COSINE	SY015090
993	8	0277	9401	ADD	0, 1	"INCREMENT POINTER FOR SIN	SY015100
994	14	0278	8660	ADD	16, 0	"USE DATA POINTER TO SUM SINE	SY015110
995	16	0279	9401	ADD	0, 1	"INCREMENT POINTER FOR NEXT PAIR	SY015120
						"ARE THERE MORE	SY015130
996	24	027A	C448 (0273)	BXU	4, \$3	"TERMS TO ADD TO THE SUM'S?	SY015140
997	2R	027B	9451	ADD	5, 1	"FORM FINAL RESULT"	SY015150
998	6	027C	F4540400	LSA	5, 10	"= ((SUM SIN)**2 + (SUM COS)**2)	SY015160
999	8	027E	A445	CLA	4, 5	" / (NUMBER OF TERMS)	SY015170

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1000	10	027F	9C50	CLAM	5,0	"THE SUM'S ARE IN COUNTS AT B15	SY015310
1001	26	0280	6822	MPYD	2,2	"NO OF TERMS IS AN INTEGER AT B5	SY015320
1002	42	0281	6866	MPYD	6,6	"RESULT IS COUNTS SQUARED AT B25	SY015330
1003	46	0282	8C62	ADDD	6,2	SUM SQ B30	SY015340
1004	172	0283	DC64	DIVD	6,4	C(1) INCREMENT B25	SY015350
1005	194	0284	D550	BBK	5		SY015360
							SY015370
						R0 = BASE + CLK + I	SY015380
						R1 = LAST ADDRESS OF THIS SET OF DATA	SY015390
						R2 = SUM Y	SY015400
						R3 = SUM X	SY015410
						R4 = TERM COUNT	SY015420
						R5 = NUMBER OF TERMS	SY015430
						R6 = CLK	SY015440
						R7 = NUMBER OF TERMS	SY015450
						R8 = TEMP	SY015460
						R9 = I	SY015470

EX015480

EX015490

*H015500

*H015510

*H015520

*H015530

EX015540

EXECUTIVE

* FIVE MILLISEC OMEGA INTERRUPT PROGRAM

* ALL TASKS ARE INITIATED FROM THIS ROUTINE

1006	12R	0285	868C	(008C)	EXEC	FETD	0,,TIME	"INCREMENT CURRENT COMPUTER TIME	EX015550
1007	20	0286	96E8	(00EB)		ADD	0,,=DX(1)	"BY 5 MILLISEC (LOW ORDER BIT)	EX015560
1008	30	0287	783C	(008C)		STAD	0,,TIME		EX015570
1009	34	0288	F8097FFF			CONH	0,,X17FFF	"DO NOT LET TIME OVERFLOW	015580
1010	38	028A	D013	(028E)		BNE	\$2		015590
1011	10R	028B	D710			PRN	1		015600
1012	16	028C	04000306			BUC	SYNCS9		015610
1013	8R	028E	030C		*	SET	PROGRAM_SEQUENCING	"100 MILLISECOND MONITOR SIGNAL	*1015620
1014	20	028F	86C6	(00C6)	\$2	FETD	0,,GMT	"FOR MAFI INDICATOR	EX015630
1015	28	0290	96E8	(00EB)		ADD	0,,=DX(1)	"INCREMENT GMT FOR MAGNETIC TAPE	% 015640
1016	40	0291	7C46	(00C6)		PTD	0,,GMT		% 015650
1017	48	0292	9A97	(0097)		COMO	0,,OMEGA_TIME		% 015660
									% 015670
									*H015680
									*H015690
1018	58	0293	06020099		*	BGE	"IS IT TIME		*1015700
1019	9R	0295	9A93	(0093)		COMO	I,,OMEGA_TASK "TO START A NEW OMEGA TASK?		EX015710
							0,,NON_OMEGA_TIME		% 015720
1020	12	0296	D021	(0298)		BGE	"IS IT TIME TO		*1015730
							DO_NON_OMEGA_TASK "START A NEW NON OMEGA TASK?		EX015740
1021	14R	0297	D510			END_EXEC	1	"RETURN TO INTERRUPTED PROGRAM	*H015750
									EX015760

* NOTE - TIME IS IN REGISTERS 0 AND 1

* WHEN BEGINNING A NEW OMEGA TASK

* IS IT TIME

* TO START A NEW OMEGA TASK?

* DO_NON_OMEGA_TASK

* "START A NEW NON OMEGA TASK?

* "RETURN TO INTERRUPTED PROGRAM

* 1

```
EX015770
*H015780
*H015790
*H015800
*H015810
*H015820
*H015830
EX015840
EX015850
EX015860
*H015870
*H015880
*H015890
EX015900
EX015910
EX015920
EX015930
EX015940
EX015950
EX015960
EX015970
EX015980
*H015990
*H016000
*H016010
*H016020
*H016030
*H016040
*H016050
*H016060
*H016070
*H016080
*H016090
EX016100
EX016110
EX016120
EX016130
EX016140
EX016150
EX016160
EX016170
EX016180
EX016190
```

NON OMEGA TASK

* THIS ROUTINE SELECTS THE NEXT NON OMEGA TASK
* FROM A TABLE. AFTER ALL TASKS HAVE BEEN
* EXECUTED IT UPDATES THE TIME OF NON OMEGA
* TASKS BY .1 SEC.

DO_NON_OMEGA_TASK;
CLAD
CLAM

0,,NON_OMEGA_TASK_INDEX "READ LAST VALUE OF TABLE
1,,END_TASK-NON_OMEGA_TASK "POINTER
*(POINTER + 1)
0,,\$1 "HAVE ALL ENTRIES BEEN EXECUTED?
0,,OLD_NON_OMEGA_TASK_TIME "COMPUTE THE TIME
0,,=020 "THE NON OMEGA TASK SHOULD BE
"INITIATED AGAIN BY ADDING .1 SEC
"TO THE TIME THAT THEY WERE LAST
"INITIATED.
0,,OLD_NON_OMEGA_TASK_TIME
0,,NON_OMEGA_TASK_TIME "SAVE NEXT NON OMEGA TASK TIME
0,,NON_OMEGA_TASK_INDEX "SAVE NEW POINTER VALUE
1X0,,NON_OMEGA_TASK_TABLE "SELECT TASK FROM TABLE
OMEGA DEBUG
VELOCITY PROCESSING
OMEGA DEBUG
RIJ UPDATE
OMEGA DEBUG
OMEGA DEBUG
PANEL MAIN
OMEGA DEBUG
AD IO TEST
OMEGA DEBUG
SLOW
START OMEGA

* THE TABLE CONSISTS OF 12 ENTRIES
*
* THE SECOND ENTRY IS THE FIRST
* ROUTINE EXECUTED AND THE FIRST
* ENTRY IS THE LAST ROUTINE
* EXECUTED IN A GIVEN .1 SEC
* PERIOD. AFTER THE LAST ROUTINE
* IS EXECUTED THERE IS A WAIT
* (USUALLY .04 SEC) BEFORE THE
* FIRST ROUTINE IS EXECUTED AGAIN.
* ONE ROUTINE IS EXECUTED EACH 5
* MILLISECNDOS

NON_OMEGA_TASK_TABLE;
CON
CON
CON
CON
CON
CON
CON
CON
CON
CON
CON
CON

OMEGA_DEBUG
VELOCITY_PROCESSING
OMEGA_DEBUG
RIJ_UPDATE
OMEGA_DEBUG
OMEGA_DEBUG
PANEL_MAIN
OMEGA_DEBUG

Address	Label	Value
1022	8R	0298 9E91 (0091)
1022	10	0299 9C18
1023		
1024	20	029A F40C02A0
1025	12R	029C 8695 (0095)
1026	20	029D 96ED (00ED)
1027	30	029E 7815 (0095)
1028	42	029F 7C13 (0093)
1029	10R	02A0 7811 (0091)
1030	20	02A1 070002A3
1031		
1031	02A3	1947
1032	02A4	0690
1033	02A5	1947
1034	02A6	0701
1035	02A7	1947
1036	02A8	1947
1037	02A9	0E82
1038	02AA	1947

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EX016200
EX016210
EX016220
EX016230

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AD_IO_TEST
OMEGA_DEBUG
SLOW
START_OMEGA

02A8 1949
02AC 1947
02AD 02AF
02AE 0334

1039
1040
1041
1042

CON
CON
CON
CON
END_TASK


```
EX016240
EX016250
EX016260
EX016270
EX016280
EX016290
EX016300
EX016310
EX016320
EX016330
EX016340
EX016350
EX016360
EX016370
EX016380
EX016390
EX016400
EX016410
EX016420
EX016430
EX016440
EX016450
EX016460
EX016470
EX016480
EX016490
EX016500
EX016510
EX016520
EX016530
EX016540
EX016550
EX016560
EX016570
EX016580
EX016590
EX016600
EX016610
EX016620
EX016630
EX016640
EX016650
EX016660
```

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ONE SECOND

THIS ROUTINE IS A NON OMEGA TASK THAT
WILL CYCLE THROUGH A TABLE OF TEN ENTRIES
EXECUTING ONE TASK EACH TIME (THEREBY
YIELDING ROUTINES EXECUTED ONCE A SECOND)

LOW CLA 0,,SLOW_RATE "READ LAST VALUE OF TABLE POINTER AND RESET
"INCREMENT POINTER AND RESET
"TO ZERO IF IT GOES TO 10

CLAM 1,,9
BXU 0,,\$1
STA 0,,SLOW_RATE

BUC IX0,,ONE_SEC "SAVE NEW VALUE OF POINTER
"SELECT NEXT TASK FROM TABLE
RZ UPDATE 2ND

"THE TABLE CONSISTS OF 10 ENTRIES
"WHERE THE FIRST, 4TH, AND LAST 5 ENTRIES
"RETURN TO THE INTERRUPTED PROGRAM RZ TIME UPDATE 3RD
"AS THERE ARE ONLY 3 1 SEC ROUTINES GP TEST 5TH

ONE_SEC
\$101
\$100
\$102
\$103
\$104

END_EXEC
RZ_UPDATE
RZ_TIME_UPDATE
END_EXEC
GP_TEST
OSC_TEST
END_EXEC
OPER_P_C
END_EXEC
END_EXEC

NO MAG VAR IN SUB

OSCILATOR DRIFT TEST

BECOMES TYPE ROUTINE ENTRY
DATA COLLECT WHEN LOADED

OMEGA_TASK_TABLE,;
SYNCL
SYNCL
SYNCL
SYNCL
SYNCL
START_SLOT
END_SLOT

SYNCL
40
SYNCL2
30
SYNCL3
20
START_OF_SLOT
30
END_OF_SLOT

1043 6R 02AF 9E24 (00A4)

1044 8 0280 9C19
1045 16 0281 C400 (0282)
1046 8R 0282 7024 (00A4)

1047 18 0283 07000285

1048 0285 0297
1049 0286 1579
1050 0287 1598
1051 0288 0257
1052 0289 1948
1053 028A 194D
1054 028B 0297
1055 028C 0EA2
1056 028D 0257
1057 028E 0297

1058 028F 02E7
1059 02C0 0028
1060 02C1 02F3
1061 02C2 001E
1062 02C3 0300
1063 02C4 0014
1064 02C5 0538
1065 02C6 001E
1066 02C7 0544

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1067	02C8	0014	CON	20	START_OF_BURST	EX016670
1068	02C9	0635	CON	30	K_FILTER	EX016680
1069	02CA	001E	CON	0	END_OF_BURST	EX016690
1070	02CB	0765	CON	1	PREFLIGHT_TEST	EX016700
1071	02CC	0000	CON	10	PREAMP_TEST\$1	EX016710
1072	02CD	0357	CON	200	PREAMP_TEST\$2	EX016720
1073	02CE	0001	CON	200	RF_TEST\$1	EX016730
1074	02CF	194F	CON	200	AD_TEST\$1	EX016740
1075	02D0	000A	CON	8	RF_TEST\$2	EX016750
1076	02D1	135A	CON	200	PD_TEST\$1	EX016760
1077	02D2	00C8	CON	200	PC_TEST\$1	EX016770
1078	02D3	1965	CON	200	PC_TEST\$2	EX016780
1079	02D4	00C8	CON	200	DMA_TEST\$1	EX016790
1080	02D5	1983	CON	1	PD_TEST	EX016800
1081	02D6	00C8	CON	4	RF_TEST	EX016810
1082	02D7	1982	CON	10		EX016820
1083	02D8	0008	CON			EX016830
1084	02D9	198A	CON			EX016840
1085	02DA	00C8	CON			EX016850
1086	02DB	19ED	CON			EX016860
1087	02DC	00C8	CON			EX016870
1088	02DD	1A0A	CON			EX016880
1089	02DE	00C8	CON			EX016890
1090	02DF	1A15	CON			EX016900
1091	02E0	00C8	CON			EX016910
1092	02E1	1A27	CON			EX016920
1093	02E2	0001	CON			EX016930
1094	02E3	19E9	CON			EX016940
1095	02E4	0004	CON			EX016950
1096	02E5	197A	CON			EX016960
1097	02E6	000A	CON			EX016970

200 X 5 MSEC = 1 SECOND

SYNCHRONIZATION

* ENTERED .2 SEC AFTER PREFLIGHT TESTS

```

1098 70R 02E7 0801 SYNC OMEGA 0,, SYNC2-OMEGA_TASK_TABLE/2 "AFTER THIS TASK .15 SECS #1017020
1099 76 02E8 8401 FETM 0,, X(0001) "SET + A LOOP FOR FLOATER ANTENNA SY017030
1100 84 02E9 F0081F8C COM 0,, FLOATER "READ STATE OF THE ANTENNA SELECT #1017050
1101 89 02EB 0061 (02ED) BRE $1 "WORD 1=FLOAT 0=LOOP SY017060
1102 2R 02EC 9C06 CLAM 0,, 6 "IS THE SYSTEM #2017070
1103 8R 02ED C010 FET 1,0 "OPERATING WITH THE FLOATER SY017080
1104 26 02EE F4270020 PTR 2,, ANTENNA_SWITCHING_MATRIX_OUTPUT_10_2 "3 FREQ SY017090
1105 34 02F0 F80F8CC0 IOC 0,, X(8CC0) "LOOP ANTENNA" 017100
1106 42 02F2 05F0 B8K 15 "SELECT +8 LOOP AND A LOOP +90 SY017110
"WRITE LOOP SELECTIONS INTO SY017120
"ANTENNA SWITCHING MATRIX FOR ALL SY017130
PROG CONT - SEND GO LIGHT SY017150
SY017160
SY017170

```

* SECOND SYNC TASK - CLEAR 10.2 REGISTERS AND START SYNC

* SECOND SYNC TASK - CLEAR SIN/COS REGISTERS

* AND START FIRST SYNC 10 SECOND PERIOD

```

1107 10R 02F3 780B (0088) $2 0,, START_SYNC_TIME "SAVE SYNC START TIME" SY017210
"THE SYNC PROCESS WILL DETERMINE SY017220
"WHEN STATION A STARTS ITS 10.2 SY017230
"BURST WITHIN THE FIRST 10 SECONDS SY017240
"PERIOD. THE SYNC START TIME IS SY017250
"THE VALUE OF THE COMPUTER REAL SY017260
"TIME COUNTER AT THE START OF THE SY017270
"FIRST TEN SECOND BURST. SY017280
"SET UP THIRD SYNC TASK .1 SECS #1017290
OMEGA TASK_TABLE/2 "AFTER THIS TASK SY017300
FETM 7,, 0 "CLEAR ALL SIN/COS INPUT REGIS- SY017310
"TERS TO START SYNC DATA SY017320
PTR 5,, COS_10_2 "COLLECTION SY017330
CLA 0,, MX2000 "ILLUMINATE SYNC LAMP ON THE #5017340
MRG 0,0,C_1,STATUS_IMAGE "C/I PANEL SY017350
CLAM 0,, SYNC_DATA "SET DATA BASE ADDRESS TO THE #5017360
STA 0,, SYNC_BASE "FIRST STORAGE AREA FOR FIRST 10 SY017370
B8K 1 "SECONDS (200 DATA WORDS) SY017380
SY017390

```

* THIRD SYNC TASK - DATA COLLECTION

#H017400

MOD	36	05/18/76	AM/BRN-7	ENTERED EVERY .1 SEC UNTIL SYNC	IS COMPLETE	OMEGA	SNS	BRE	CLA	ADD	STA	LGC	BUC	FET	CLAM	CLAM	CLAD	STAD	SUBQ	STAD	8XUD	PRN	STAD	COMM	BNE	ADD	BUC	SUB	8XUD	FETM	PAGE
1116	70R	0300	0802		\$3																									54	
1117	78	0301	0250		*																										*H017410
1118	82	0302	0066	(0309)																											*H017420
1119	6R	0303	9E4F	(00CF)	\$19																										*1017430
1120	8	0304	9401																												*1017440
1121	16	0305	704F	(00CF)																											*1017450
1122	2R	0306	0F00		*																										*1017460
1123	8	0307	04000166		\$9																										*1017470
1124	34R	0309	F06C1E78		\$8																										*1017480
1125	38	0308	FC6900C6		*																										*1017490
1126	40	0309	9C44																												*1017500
1127	50	030E	FD3A0011		*																										*1017510
1128	60	0310	7852																												*1017520
1129	64	0311	8800																												*1017530
1130	76	0312	F9370011		*																										*1017540
1131	86	0314	FC5C0331		*																										*1017550
1132	10R	0316	0710																												*1017560
1133	20	0317	7807	(0087)																											*1017570
1134	24	0318	F8091C1E		*																										*1017580
1135	28	031A	0012	(031D)																											*1017590
1136	6R	0316	9679	(00F9)	*																										*1017600
1137	10	031C	0001	(031E)																											*1017610
1138	6R	031D	9279	(00F9)	\$5																										*1017620
1139	8R	031E	CC10	(031F)	*																										*1017630
1140	16R	031F	8450		\$7																										*1017640

"SET UP TO REENTER THIS TASK
 "READ BITE DISCRETE"
 "PFG_COUNTDOWN_NO_GOOD" "FROM RECEIVER"
 "IS THE PRECISION
 "FREQUENCY GENERATOR OK?"
 "FAILURE"
 "INCREMENT FAIL COUNT"
 "DO NOT ALLOW INTERRUPTS UNTIL
 "AFTER SYSTEM INITIALIZATIONS
 "RESTART SYSTEM"
 "READ CURRENT DATA COUNTER (0 TO
 "198 BY 2'S), FREQ COUNTER (0 TO
 "4 BY 2'S), AND BASE ADDRESS OF
 "DATA FOR THIS 10 SEC PERIOD
 "MAX DATA COUNTER
 "MAX FREQ COUNTER
 "READ SIN/COS DATA PAIR INDEXED
 "BY FREQ AND SAVE IN DATA STORAGE
 "AREA INDEXED BY DATA COUNTER
 "CLEAR SIN/COS REGISTERS TO BEGIN
 "NEXT .1 SEC DATA COLLECTION TIMES
 "DATA COUNTER +2
 "IS DATA COLLECTION COMPLETE?
 "10 SEC PERIOD COMPLETE
 "SAVE DATA BASE ADDRESS AND FREQ
 "SIN/COS DATA
 "NUMBER FOR SYNC COMPUTATIONS
 "WAS THE DATA
 "SAVED IN THE SECOND SYNC STORAGE
 "AREA?
 "SET NEW BASE ADDRESS TO THE
 "SECOND STORAGE AREA
 "SET NEW BASE ADDRESS TO THE
 "FIRST STORAGE AREA
 "INCREMENT TO
 "NEXT FREQ - RESET TO 10.2 IF OLD
 "FREQ WAS 13.6
 "CLEAR SIN/COS INPUT REGISTERS TO

[illegible]

START OMEGA NAVIGATION

* THIS ROUTINE TRANSLATES THE TIME DETERMINED
* BY THE SYNC PROCESS INTO THE TIME THAT THE
* OMEGA NAVIGATION TASKS SHOULD BE PERFORMED

1156	8R	0334	861C	(009C)	START_OMEGA_FET	0,,START_OMEGA_NOW	"READ MARKER FROM SYNC	SY018090
1157	12	0335	D260	(0356)	BRE	"COMPUTATION PROGRAM	SY018100	
1158	12R	0336	8688	(0088)	FETO	"HAS SYNC JUST BEEN COMPLETED?	SY018110	
						"THIS TIME IS IN COMPUTER REAL	SY018120	
						"TIME AND REPRESENTS THE START	SY018130	
						"OF STATION A 10.2 BURST. THIS	SY018140	
						"TIME IS LESS THAN THE CURRENT	SY018150	
						"VALUE OF TIME.	SY018160	
							SY018170	
							SY018180	
							SY018190	
							SY018200	
							SY018210	
							SY018220	
							SY018230	
							SY018240	
1159	22	0337	FC3A008C		CLAD	3,,TIME	SY018250	
							SY018260	
							SY018270	
							SY018280	
							SY018290	
							SY018300	
1160	32	0339	FC081A82		ADDD	0,,=DI(220-65)	SY018310	
							SY018320	
							SY018330	
							SY018340	
							SY018350	
							SY018360	
							SY018370	
1161	10R	0338	FC081A84		ADDD	0,,=D2000	SY018380	
1162	14	033D	8803		COMD	0,3	SY018390	
1163	18	033E	0844	(0338)	BLE	\$1	SY018410	
1164	10R	033F	FC081A86		ADDD	0,,=D4	SY018420	
1165	20	0341	7817	(0097)	STAD	0,,OMEGA_TIME	SY018430	
1166	30	0342	FC081A88		ADDD	0,,=D16	SY018440	
							SY018450	
							SY018460	
							SY018470	
1167	8R	0344	92ED	(00ED)	SUBD	0,,=D20	SY018480	
1168	12	0345	8803		COMD	0,3	SY018490	
							SY018500	
							SY018510	

"COMPUTE DESIRED TIME OF STARTING
"THE NON OMEGA TASKS JUST PRIOR
"TO THE END OF STATION A 10.2
"BURST
"= SYNC TIME + .775 SEC
"= SYNC TIME + A BURST TIME (.9)
" - PART OF BURST NOT USED AT
" END (.1) - TIME BETWEEN START
" KALMAN AND END BURST (.005)
" - NUMBER OF NON OMEGA TASKS
" BE EXECUTED BEFORE KALMAN TIME
" (4 = .020)
"NON OMEGA TASK START TIME
"+ 10 SECONDS = NEXT POSSIBLE
"START TIME
"HAS THE NEXT
"POSSIBLE START TIME PASSED?
"NON OMEGA TASK START TIME +
".020 = TIME OF NEXT OMEGA TASK
"(KALMAN)
".1 SEC INTERVAL
"FORM OMEGA TASK START TIME
"+ .080 = NEXT NON OMEGA TASK
"START TIME
"NEXT NON OMEGA TASK START TIME
"- .100 (.1 IS TIME

1169	16	0346 0833 (0344)	BRG	\$2	"INTERVAL BETWEEN STARTS) "IS THIS START "TIME STILL IN THE FUTURE? "THIS TIME NOW REPRESENTS THE 0,,OLD_NON_OMEGA_TASK_TIME "MOST RECENT POSSIBLE NON OMEGA "START TIME "WRITE TIME IN OLD NON OMEGA TASKSVOL18590 "TIME - BECAUSE THE NON OMEGA "TASKS ARE NOT COMPLETE FOR THIS "INTERVAL THE NEXT INTERVAL WILL "BE UPDATED FROM THE 'NEW' OLD "TIME. THE NEXT INTERVAL MAY NOT "BE EXACTLY .1 SEC. 0,,KALMAN_FILTER "SET NEXT OMEGA TASK = KALMAN 0,,OMEGA_TASK 1,X(2000) 0,,C_I_STATUS_IMAGE 0,,START_OMEGA_NOW "RESET MARKER FROM SYNC "COMPUTATION PROGRAM "100 MILLI SEC MONITOR SIGNAL 1,,KAL_STA_FLG SET NON ZERO PROGRAM_SEQUENCING "FOR MALF INDICATOR CALC_TIME_CORRECTION 6 "EXIT"	SVOL18520 *1018530 SVOL18540 SVOL18550 SVOL18560 SVOL18570 SVOL18580 SVOL18590 SVOL18600 SVOL18610 SVOL18620 SVOL18630 SVOL18640 SVOL18650 SVOL18660 SVOL18670 SVOL18680 SVOL18690 SVOL18700 SVOL18710 SVOL18720 SVOL18730 SVOL18740 SVOL18750 SVOL18760 SVOL18770 SVOL18780 SVOL18790
1170	10R	0347 7815 (0095)	STAD			
1171	14	0348 FC090765	CLAM			
1172	22	034A 7019 (0099)	STA			
1173	32	0348 F4182000	FETH			
1174	44	034D E001009F	MRG			
1175	52	034F 701C (009C)	STA			
1176	62	0350 F0170090	STA			
1177	70	0352 030C	SET			
1178	78 *	0353 F8001613	BSV			
1179	102	0355 D560	BBK			
1180	16R	0356 D520	BBK	2	"EXIT"	
				\$3		
				*		

EB018800
*H018810
*H018820
*H018830
*H018840
*H018850
*H018860
*H018870
*H018880
*H018890
*H018900
*H018910
*H018920
*H018930
*H018940
*H018950
*H018960
*H018970
*H018980
*H018990
*H019000
*H019010
*H019020
*H019030
*H019040
*H019050
*H019060
*H019070
*H019080
*H019090
*H019100
*H019110
*H019120
*H019130
*H019140
*H019150
*H019160
*H019170
*H019180
*H019190
*H019200
*H019210
*H019220

END OF BURST

* THIS IS AN OMEGA TASK THAT IS EXECUTED AT THE CONCLUSION OF
* THE STATION BURST DATA COLLECTION PERIOD WHICH ENDS .1 SEC
* BEFORE THE ACTUAL STATION BURST ENDS. THIS ROUTINE SELECTS
* THE PROPER ANTENNA / CALIBRATE SIGNALS FOR THE SLOT MEASURE-
* MENT AND COMPUTES THE PHASE AND PHASE VARIANCE OF THE STATION
* BURST. IT EXITS DIRECTLY TO THE TRACKING FILTER PROGRAM.

* SET UP NEXT OMEGA TASK TO OCCUR

END_OF_BURST:

OMEGA

FETM

0357 0803
0358 F4081F08

70R
78

1181
1181
1182

035A FC5C0011
035C 7656

108
136

1183
1184

035D 8635 (0085)

144

1185

035E F50A178D
0360 C010
0361 F4270020

152
160
178

1186
1187
1188

STATION - SIGNAL DURING NEXT SLOT

A (= 0) TEST + 90 (CALIBRATE)

B (= 1) LOOP A (NOISE / PHANTOM)

C (= 2) - TEST (CALIBRATE)

D (= 3) LOOP A (NOISE / PHANTOM)

E (= 4) TEST (CALIBRATE)

F (= 5) LOOP B (NOISE / PHANTOM)

G (= 6) -(TEST + 90) (CALIBRATE)

H (= 7) LOOP B (NOISE / PHANTOM)

FET

0,, NOISE_COMPUTED_MARKER

BNE \$30

0363 8618 (0098)

186

1189

0364 D011 (0366)

190

1190

* ARE THE FIRST

* NOISE MEASUREMENTS AVAILABLE?

* EXIT

* DO NOT TAKE ANY BURST MEASURE-

1191	14R	0365 D510	88K	1	"MENTS UNTIL NOISE DATA IS	EB019230
1192	6R	0366 9E7B	CLA	0,,CAL_R_ADD	"AVAILABLE	EB019240
1193	14	0367 8411	FETM	1,,1	"SET UP A 3 DOUBLE COUNTER TO	EB019250
1194	38	0368 8494	FETM	9,,4	"CYCLE ON THE 3 FREQUENCIES	EB019260
1195	48	0369 FC6A1F17	CLAD	6,,BURST_TIME	"SET UP A 2 SINGLE COUNTER TO	EB019270
1196	58	0368 FC3A1A8A	CLAD	3,,=DF(1.0D2B-13)	"CYCLE ON THE COS AND SIN TERMS	EB019280
1197	184	0360 DC63	DIVD	6,,3	"READ ACTUAL BURST TIME AND	EB019290
					"RESCALE TO SEC AT B1	EB019300
1198	6R	036E F0854000	RSL	8,,1	SINGLE INDEX	EB019310
1199	14	0370 F58A0035	CLA	X8,,ANTENNA_SELECT_SAVE	EB019320	EB019330
					"COMPUTE POINTER TO PROPER PHAN-	EB019340
					"TOM CORRECTIONS FOR THIS FREQ	EB019350
					"BASED ON ANTENNA LOOP (A OR B)	EB019360
					"SELECTED FOR THIS STATION	EB019370
1200	16	0372 B400	ADD	0,0	8 OR 2	EB019380
1201	20	0373 FC591FA4	CLAM	5,,Y_P-2		EB019390
1202	22	0375 B450	ADD	5,0	YP ADDR +6 OR 0	EB019400
1203	2R	0376 A434	CLA	3,4	SAVE YB AFTER FIRST PASS	EB019410
1204	8	0377 A64D	CLA	14,13	READ BURST DATA AT B15	EB019420
1205	14	0378 A5C0	CLA	X12,0	BIAS AT B14	HH019430
1206	20	0379 6C06	MPY	0,6	DTB AT B1 = BIAS AT B15	HH019440
1207	22	037A 8040	SUB	4,0	SUBTRACT BIAS FROM BURST	HH019450
1208	28	037B A5C6	CLA	X12,6	SF B14	EB019460
1209	60	037C D440	DIV	4,0	X8 AT B1	EB019470
					"COMPUTE YB OR XB FOR THIS FREQ	EB019480
					"Y8 = COS/AY - YP * DELTA T BURST	EB019490
					" SCALED B1	EB019500
					"XB = SIN/AX - XP * DELTA T BURST	EB019510
					"YB IS COMPUTED ON THE FIRST PASSE	EB019520
					"AND XB ON THE SECOND	EB019530
1210	66	037D A785	CLA	1X8,5		EB019540
1211	72	037E 6006	MPY	0,6	YN * DTB	EB019550
1212	74	037F 8400	ADD	0,0	B1	EB019560
1213	2R	0380 8040	SUB	4,0	PHANTOM CORR. NOP FOR PCI.	EB019570
1214	4	0381 9453	ADDM	5,,3	INC ADDR	EB019580
1215	6	0382 9401	ADDM	13,,1	INCREMENT DATA AND	EB019590
1216	8	0383 94C1	ADDM	12,,1	INC CALIB ADDR	EB019600
1217	16	0384 C4AF	8XU	10,,1	"ARE YB AND XB COMPUTED?	EB019610
						EB019620
						EB019630
						EB019640
						EB019650

R0 = TEMP D
R3 = Y(B) S

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1248	32	03AA	F9C71F25	STAD	START PHASE VARIANCE COMPUTATION	X12, RAW_H IX7,2	"PRODUCT OF Q'S FOR BASE STATION "SELECTION)	EB020090
1249	38	03AC	A772	CLA	IX7,2		"H020110	EB020100
1250	40	03AD	9C10	CLAM	1,0		"020120	"020130
1251	44	03AE	AC6A	CLAD	6,10		"020140	"020150
1252	48	03AF	8868	SUBD	6,8		DTB - QM B1	
1253	52	0380	0031	BRG	57		"IS QM GREATER THAN DELTA TB?	EB020160
1254	4R	0381	8866	SUBD	6,6		"PHASE VARIANCE WILL BE NEGATIVE	EB020170
1255	4R	0382	8880	SUBD	8,0		"FORCE NUMERATOR TO ZERO	EB020180
1256	20	0383	688A	MPYD	8,10		"FORM NUMERATOR OF VARIANCE	EB020190
1257	36	0384	6806	MPYD	0,6		" = Q1(DTB - QM) AT 84PI**2	EB020200
1258	56	0385	F8061A8C	MPYD			"AND DENOMINATOR	EB020210
1259	60	0387	8808	COMD			" = DTB(QM - QT) AT B2	EB020220
1260	64	0388	0052	BRL	\$6		0, = DF((11)/3.1415926582) SCALE AT	EB020230
1261	6R	0389	9E64	CLA	0, HK8000		SEE IF DIVIDE WILL OVERFLOW	EB020240
1262	10	038A	0002	BUC	\$5		"WILL THE DIVIDE	"2020250
1263	126R	038B	DC08	DIVD	0,8		"OVERFLOW OR THE QUOTIENT BE	"020260
1264	128	038C	9401	ADDM	0,1		"NEGATIVE?	EB020270
							"SET PHASE VARIANCE NEGATIVE AS	EB020280
							"MARKER TO TRACKING FILTER	EB020290
							"INDICATING NO MEASUREMENT	EB020300
							"COMPUTE PHASE VARIANCE	EB020310
							"SIGMA SQ M = Q1(DTB - QM) /	EB020320
							" DTB(QM - QT) + (.005)**2	EB020330
							" SCALED (2PI)**2 OR 1 SQ CYCLE	EB020340
								EB020350
								EB020360
							R0 = PHI(MID, SIGMA**2PHI(MID)	EB020370
							R2 = ADDRESS OF Q(T)	EB020380
							R3 = ADDRESS OF PHI(O)	EB020390
							R4 = ADDRESS OF SIGMA**2PHI(M)	EB020400
							R5 = ADDRESS OF PHI(M)	EB020410
							R6 = Y(B) D	EB020420
							R8 = X(B) D	EB020430
							RA = CELTA T(B) D	EB020440
							RC = 3 D COUNTER	EB020450
							RD = END 3 COUNTER	EB020460
								EB020470
								EB020480
							"SAVE PHASE VARIANCE"	EB020490
							"HAVE ALL 3	EB020500
								"1020510

IX12,4
3

STAD
PRN

038D 76C4
038E D730

10R
24

1265
1266

*

"FREQUENCIES BEEN PROCESSED?"

8.9.84

AN/BRN-7
BXUD
* CONTINUE WITH TRACKING FILTER PROGRAM

038F FCRC036E

34

1267

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TRACKING FILTER

R0=ADDR OF SIGMA**2 PHI M
R1=ADDR OF PHI M
R2=Y(8) D
R4=X(8) D
R6=DELTA T(8) D
R8=3D COUNTER
R9=END 3D COUNTER
RA=TEMP D
RC=TEMP D

TRACKING FILTER

* THIS PROGRAM IS EXECUTED AT THE END OF EVERY STATION BURST.
* IT SMOOTHS THE COMPUTED PHASE AND PROVIDES OUTPUTS TO KALMAN.
* FOR NOTATIONAL PURPOSES THE SYMBOLS LISTED BELOW WILL BE USED

* PB = BURST PHASE MEASUREMENT
* SB = BURST PHASE MEASUREMENT VARIANCE
* P = TRACKING FILTER PHASE ESTIMATE
* PR = TRACKING FILTER PHASE RATE ESTIMATE
* PRDR = PHASE RATE DUE TO CRAFT MOTION TOWARDS THE STATION
* DTB = DELTA T BURST
* DT = TIME BETWEEN TRACKING FILTER TIME UPDATES
* S = TRACKING FILTER PHASE ESTIMATE VARIANCE
* SR = TRACKING FILTER PHASE RATE ESTIMATE VARIANCE
* SC = CROSS CORRELATION OF PHASE AND PHASE RATE VARIANCE
* C = CYCLE

* N = TRACKING FILTER N COUNTERS
* DTM = TIME BETWEEN TRACKING FILTER MEASUREMENTS (10 SECONDS)

TRACKING_FILTER:

FET
PRN
BNE
FETM
FETD

0, RESET_IF "READ THE 'RESET IF MARKER'
0
\$10 "SHOULD THE
1, OS#6-2 "TRACKING FILTERS BE RESET?
0, =DF((1)/12)

1268 03C1 3600 (0080) 8R
1268 03C2 0700 16
1270 03C3 001F (0303) 20
1271 03C4 F418002E 10R
1272 03C6 86E9 (00E9) 22

TF020540
TF020550
TF020560
TF020570
TF020580
TF020590
TF020600
TF020610
TF020620
TF020630
TF020640
TF020650
TF020660
*H020670
*H020680
*H020690
*H020700
*H020710
*H020720
*H020730
*H020740
*H020750
TF020760
*H020770
*H020780
*H020790
*H020800
*H020810
*H020820
*H020830
*H020840
*H020850
TF020860
*H020870
*H020880
*H020890
TF020900
TF020910
TF020920
*1020930
*H020940
* 020950
* 020960

1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292
1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292
MOD 36	05/18/76	AN/BRN-7	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD	STAD
\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11
03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7	03C7
F9271E33	CC23 (03C7)	F438Q017	F41A010F	E1211D88	C423 (03CE)	0301 0770	0302 701D (009D)	0303 7000 (0090)	0304 F05C16F8	0306 F438002E	0308 F4C41F8E	030A F0C8009D	03DC D068 (03E5)	0300 F0C7009D	03DF 8800	03E0 7872	03E1 FCOA1A8E	03E3 7862	03E4 CC26 (030F)
4R	20	14R	22	12R	20	22R	30	8R	38	52	60	68	72	10R	4R	14	24	34	42
TF020970	TF020980	TF020990	TF021000	TF021010	TF021020	TF021030	TF021040	TF021050	TF021060	TF021070	TF021080	TF021090	TF021100	TF021110	TF021120	TF021130	TF021140	TF021150	TF021160
X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI	X2,,SIGMA_SQ_PHI_PHI
OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2	OPEN S UP TO 1/12 C**2
(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)	(ALL FILTERS)
2,,\$11	3,,OS*3-1	1,,HX00FF	X2,1,SIGMA_SQ_N_COUNTER	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)	"SET N = 0 (ALL FILTERS)
0,,PAST_NAV_MODE	"AN APPARENT NAV MODE CHANGE	0,,RESET_TF	"RESET THE 'RESET TF MARKER'	5,,TF_SIGMA_SQ_DATA_ADDRESSES-2	3,,OS*6-2	"LOAD REGISTERS WITH ADDRESSES OF	12,,NAV_MODE	"S, SR, SC AND N	12,,PAST_NAV_MODE	"SET UP COUNTER TO CYCLE ALL	"TRACKING FILTERS (3 PER STATION)	"HAS THE NAV MODE	TF_TIME_UPDATE	"CHANGED SINCE LAST ENTRY?	12,,PAST_NAV_MODE	"RESET VARIANCES ASSOCIATED WITH	"PHASE RATE SINCE VELOCITY CHANGE	"MAY MAKE PREVIOUS ESTIMATES	"INVALID ID
TF021170	TF021180	TF021190	TF021200	TF021210	TF021220	TF021230	TF021240	TF021250	TF021260	TF021270	TF021280	TF021290	TF021300	TF021310	TF021320	TF021330	TF021340	TF021350	TF021360
TF021370	TF021380	TF021390	TF021400	TF021410	TF021420	TF021430	TF021440	TF021450	TF021460	TF021470	TF021480	TF021490	TF021500	TF021510	TF021520	TF021530	TF021540	TF021550	TF021560
TF021570	TF021580	TF021590	TF021600	TF021610	TF021620	TF021630	TF021640	TF021650	TF021660	TF021670	TF021680	TF021690	TF021700	TF021710	TF021720	TF021730	TF021740	TF021750	TF021760
TF021770	TF021780	TF021790	TF021800	TF021810	TF021820	TF021830	TF021840	TF021850	TF021860	TF021870	TF021880	TF021890	TF021900	TF021910	TF021920	TF021930	TF021940	TF021950	TF021960
TF021970	TF021980	TF021990	TF022000	TF022010	TF022020	TF022030	TF022040	TF022050	TF022060	TF022070	TF022080	TF022090	TF022100	TF022110	TF022120				

* TRACKING FILTER TIME UPDATE
 * UPDATE ALL TRACKING FILTERS
 * TO TIME OF END BURST
 TF_TIME_UPDATE;

1293	12R	03E5 8430	FETM	3,0	"COMPUTE UPDATE DELTA T (DT)	TF021440
1294	20	03E6 ADF6	CLAD	X15,6	"DT = DT8 + .4 SEC SCALED PI	TF021450
1295	28	03E7 96EF (00EF)	ADD	0,,-DF(.2)	"DT = DT8 + .4 SEC SCALED PI	TF021460
1296	48	03E8 F8061A90	MPYD	0,,-DF((2)/3.14159265) DELTA TK SCALED PI	TF021470	
1297	52	03E9 AC80	CLAD	8,0	DELTA TK	TF021480
1298	8R	03E8 AFA6	CLAD	IX10,6	SIGMA**2 PHI DOT PHI DOT	TF021490
					"TIME UPDATE S"	TF021500
					"S(NEW) = S + 2SCDT + SROT**2	TF021510
					" SCALED 1 C**2	TF021520
					DELTA TK	TF021530
1299	24	03EC 68C8	MPYD	0,8	RESCALED PRODUCT TO(8+2)PI	TF021540
1300	28	03ED AC20	CLAD	2,0	SIGMA**2 PHI PHI DOT	TF021550
1301	38	03EE F8044000	RSAD	0,1	DELTA TK	TF021560
1302	46	03F0 8FB6	ADD	IX11,6	SIGMA**2 PHI PHI	TF021570
1303	62	03F1 6808	MPYD	0,8	"DOES S(NEW) EXCEED 1 C**2?	TF021580
1304	70	03F2 8FC6	ADD	IX12,6	"SET S(NEW) = 1 C**2	TF021590
1305	74	03F3 0C76 (03FA)	BND	\$2	"SET SC(NEW) = SC/2	TF021600
1306	8R	03F4 9EF3 (00F3)	CLAD	0,,-DX(77777777)	SIGMA**2 PHI PHI DOT SCALED 2PI	TF021610
1307	18	03F5 7BC5	STAD	IX12,6	ONE HALF OF SIGMA **2 PHI PHI DOT	TF021620
1308	26	03F6 AFB6	CLAD	IX11,6	"TIME UPDATE SC"	TF021630
1309	36	03F7 F8044000	RSAD	0,1	"SC(NEW) = SC + SROT	TF021640
1310	40	03F9 D003 (03FD)	BUC	\$3	" SCALED 1/2PI C**2/SEC	TF021650
1311	10R	03FA 7BC6	STAD	IX12,6	"TIME UPDATE SR"	TF021660
1312	18	03FB AFB6	CLAD	IX11,6	"SR(NEW) = SR + R**2	TF021670
1313	22	03FC 8C02	ADD	0,2	" SCALED 1/2PI C**2/SEC**2	TF021680
1314	10R	03FD 78B6	STAD	IX11,6	"WHERE R = .000012 (C/SEC)**2	TF021690
1315	18	03FE AFA6	CLAD	IX10,6	"DOES SR(NEW)	TF021700
1316	28	03FF FC081A92	ADD	0,,-DX(000000006)	"EXCEED (.225 C/SEC)**2?"	TF021710
					"SET SR(NEW) = (.225 C/SEC)**2	TF021720
					"SET SC(NEW) = SC/2	TF021730
					SIGMA**2 PHI PHI DOT	TF021740
1317	32	0401 D075 (0407)	BND	CP	"SAVE NEW SR"	TF021750
1318	8R	0402 AFB6	CLAD	IX11,6	"ARE ALL FILTERS UPDATED?"	TF021760
1319	18	0403 F8044000	RSAD	0,1		TF021770
1320	28	0405 7B96	STAD	IX11,6		TF021780
1321	36	0406 9EF3 (00F3)	CLAD	0,,-DX(77777777)		TF021790
1322	10R	0407 7BA6	STAD	IX10,6		TF021800
1323	18	0408 CD6E (03EB)	BXUD	6,TF_TIME_UPDATE\$1		TF021810

1324	22R	0409 0770	MOD 36	05/18/76	AN/BRN-7	PRN	7	PAGE 66
			*					021830
			*					TF021840
			*					TF021850
			*					TF021860
			*					TF021870
			*					TF021880
			*					TF021890
			*					TF021900
			*					TF021910
			*					TF021920
			*					TF021930
			*					TF021940
			*					TF021950
			*					TF021960
			*					TF021970
			*					*H021980
			*					TF021990
1325	52	040A F05C1701	*					TF022000
			*					TF022010
			*					TF022020
1326	60	040C 841E						TF022030
1327	80	040D 8474						TF022040
1328	10R	040E C02C	\$1					TF022050
			*					TF022060
			*					TF022070
			*					TF022080
			*					TF022090
			*					*I022100
1329	18 *	040F F80D1707						TF022110
1330	20	0411 9486						TF022120
1331	28	0412 ADA4						TF022130
1332	32	0413 AC40						TF022140
1333	40	0414 ADA2						TF022150
1334	44	0415 AC20						TF022160
1335	56	0416 C035						TF022170
1336	70	0417 FA8400A3						TF022180
1337	84	0419 FA6400A2						TF022190
1338	88	0418 BC86						TF022200
1339	98	041C F884A4E0						TF022210
1340	114	041E 6822						TF022220
1341	130	041F 6800						TF022230
1342	134	0420 BC02						TF022240
1343	580	0421 1000						TF022250

R0=DELTA TK D
 R2=ADDR OF SIGMA**2 PHI DOT PHI DOT
 R3=ADDR OF SIGMA**2 PHI PHI DOT
 R4=ADDR OF SIGMA**2 PHI PHI
 R5=ADDR OF SIGMA**2 N COUNTER
 R6=ADDR OF SIGMA**2 PHI M
 R7=ADDR OF PHI M
 R8=NAV MODE
 R9=TEMP
 RA=X(18)D
 RC=DELTA T(18)D

START TIME UPDATE OF PHASE ESTIMATE

5, TF_PHL_DATA_ADDRESSES "LOAD REGISTERS WITH
 ADDRESSES OF TEMP, STATION
 VECTOR, RIJ, PRDR, PR AND P
 SET UP COUNTER TO CYCLE EACH
 STATION
 SET UP COUNTER FOR 3 FREQ
 START UPDATE FOR EACH STATION
 GET ADDRESSES OF TEMP, STATION
 VECTOR AND RIJ FOR MATRIX 3D
 FORM TEMP = S X RIJ TO GET
 SL2 = S DOT R2, SL3 = S DOT R3
 INCREMENT STATION VECTOR ADDRESS
 BY 6 FOR NEXT STATION
 COMPUTE PRDR FOR THIS STATION
 PRDR = -(V3*SL3 + V2*SL2)/
 (SL2**2 + SL3**2)**.5
 SCALED 1/4PI IN 13.6 C/SEC

MATRIX_3D
 11.6
 X10.4
 4.0
 X10.2
 2.0
 3.5
 18.1V3
 16.1V2
 8.6
 8.7, F((-2)*3.14159812)/.723058-1) 13.6 RADIAN
 SL2**2
 SL3**2
 0.0
 0.2
 0.0

BSX
 ADDM
 CLAD
 CLAD
 CLAD
 CLAD
 FET
 MPYDM
 MPYDM
 ADD
 MPYDM
 MPYDM
 MPYD
 ADD
 SQRT

LINE	MOD	36	05/18/76	AN/BRN-7	Q	DC	DC	706	PAGE
1344					0422	DC80		706	67
1345					0423	FOC800CB		714	TF022260
		*							TF022270
1346					0425	D015 (0428)		718	*1022280
1347					0426	F08C1F00		42R	*R022290
		*							TF022300
		*							TF022310
		*							TF022320
		*							TF022330
		*							TF022340
		*							TF022350
		*							TF022360
1348					0428	A5F3		48	PHI DOT DR BASE
1349					0429	F4871F0E		90	TF022370
1350					0428	D770		22R	TF022380
1351					042C	A414		24	FORM STATION NUMBER - BASE
1352					042D	F0154000		30	TF022390
		*							STATION NUMBER TO GET THE TIME
		*							TF022400
		*							TF022410
		*							TF022420
		*							TF022430
		*							TF022440
		*							TF022450
		*							TF022460
		*							TF022470
		*							TF022480
		*							TF022490
		*							TF022500
1353					042F	F01B00CC		38	TF022510
		*							TF022520
		*							*2022530
1354					0431	D033 (0435)		42	TF022540
		*							TF022550
1355					0432	D061 (0434)		4R	TF022560
1356					0433	9011		2R	TF022570
		*							TF022580
		*							TF022590
		*							TF022600
		*							TF022610
		*							TF022620
1357					0434	9418		2R	TF022630
		\$10							TF022640
		*							TF022650
		*							TF022660
		*							TF022670
		*							TF022680
1358					0435	D0D2 (0438)		4R	TF022690
		\$5							TF022700
		*							TF022710
		*							TF022720
		*							TF022730
		*							TF022740
		*							TF022750
		*							TF022760
		*							TF022770
		*							TF022780
		*							TF022790
		*							TF022800
		*							TF022810
		*							TF022820
		*							TF022830
		*							TF022840
		*							TF022850
		*							TF022860
		*							TF022870
		*							TF022880
		*							TF022890
		*							

LINE	MOD	36	05/18/76	AN/BRN-7	SUB	XL1, PHI DOT DR BASE	"SUB ALWAYS PHASE DIFFERENCE	PAGE 66
1359	8R	0436	FI181FOE				TF022690	
	*						TF022700	
	*						TF022710	"FORM PRDR FOR THIS SET OF THREE
	*						TF022720	"TRACKING FILTERS (3 FREQ) WHERE
	*						TF022730	"PRDR = PRDR (THIS STATION)
	*						TF022740	"MINUS PRDR (BASE)
1360	8R	0438	7394		STA	IX9,4	TF022750	"SAVE PRDR FOR THIS SET OF THREE
	*						TF022760	"TRACKING FILTERS (3 FREQ)
	*						TF022770	"
	*						TF022780	"NOTE - ALL PRDR'S ARE COMPUTED
	*						TF022790	"FOR THE 13.6 FREQ ONLY
	*						TF022800	"AND CONVERTED TO THE
	*						TF022810	"OTHER FREQUENCIES WHEN
	*						TF022820	"NEEDED
1361	26	0439	C06D		FET	6,13	TF022830	
1362	10R	043A	FO9A1768		CLAD	IX9,TF_LAMBDA_CONSTANT_TABLE	TF022840	
1363	26	043C	68C7		MPVD	0,7	TF022850	"TIME UPDATE PHI ESTIMATE (P)
	*						TF022860	"
	*						TF022870	"P2(NEW) = P + (PR + F*PRDR)*DT
	*						TF022880	"SCALED B10 IN CYCLES
	*						TF022890	"F = RATIO OF THIS FREQ TO 13.6
1364	34	043D	BF39		ADD	IX3,9	TF022900	PHI DOT ESTIMATE SCALED 8-1
1365	50	043E	6805		MPVD	0,5	TF022910	DELTA TK SCALED PI
1366	60	043F	4808		RSAD	0,12	TF022920	RESCALED TO(8+11)PI
1367	68	0440	BF49		ADD	IX4,9	TF022930	PHI ESTIMATE(K-1)SCALED 8+11PI
1368	78	0441	7B49		STAD	IX4,9	TF022940	PHI ESTIMATE(K)SCALED 8+11PI
	*						*1022950	"HAS P FOR ALL
1369	86	0442	CC99		BXUD	9,,2	%R022960	"THREE FREQUENCIES BEEN UPDATED?
1370	16R	0443	0740		PRN	4	% 022970	% 022970
1371	18	0444	94D6		ADD	13,,6	% 022980	% 022980
1372	20	0445	94C6		ADD	12,,6	% 022990	% 022990
1373	28	0446	8410		FETM	1,,0	% 023000	% 023000
1374	36	0447	CF8A		BXUD	8,,1	%R023010	%R023010
1375	24R	0448	0780		PRN	8	% 023020	% 023020
1376	48	0449	0760		PRN	8	% 023030	% 023030
	*						TF023040	TF023040
	*						TF023050	TF023050
	*						TF023060	TF023060
	*						TF023070	TF023070
	*						TF023080	TF023080
	*						TF023090	TF023090
	*						TF023100	TF023100
	*						TF023110	TF023110

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R6=NAV MODE

R7=TEMP

R8=X(B)D

R9=DELTA T(B)D

RC=3D COUNTER

RD=END 3D COUNTER

* START TRACKING FILTER MEASUREMENT UPDATE
* USE BURST PHASE AND VARIANCE TO UPDATE
* THE TRACKING FILTERS OF THE THREE STATIONS
* THAT JUST TRANSMITTED DURING THE LAST BURST

\$3

FET
MEASUREMENT_UPDATE;

044A C08D

22R

1377

044B F44A0085

8R

1378

044D A42D

10

1379

044E A63F

16

1380

044F 4442

20

1381

8,13

CLA

*

0450 B047

22

1382

0451 D022 (0454)

26

1383

0452 F4490010

4R

1384

0454 A454

2R

1385

0455 984E

4

1386

0456 04030512

10

1387

0458 9874

2R

1388

0459 D113 (0460)

6

1389

045A FCOA1F29

10R

1390

045C F04800C8

18

1391

045E D016 (0465)

22

1392

045F 8400

6R

1393

0460 F8190020

10

1394

0462 D031 (0464)

14

1395

0, RAM_H+4

CLAD

*

0, RAM_H+4

CLAD

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R6=NAV MODE

R7=TEMP

R8=X(B)D

R9=DELTA T(B)D

RC=3D COUNTER

RD=END 3D COUNTER

* START TRACKING FILTER MEASUREMENT UPDATE
* USE BURST PHASE AND VARIANCE TO UPDATE
* THE TRACKING FILTERS OF THE THREE STATIONS
* THAT JUST TRANSMITTED DURING THE LAST BURST

\$3

FET
MEASUREMENT_UPDATE;

044A C08D

22R

1377

044B F44A0085

8R

1378

044D A42D

10

1379

044E A63F

16

1380

044F 4442

20

1381

8,13

CLA

*

0450 B047

22

1382

0451 D022 (0454)

26

1383

0452 F4490010

4R

1384

0454 A454

2R

1385

0455 984E

4

1386

0456 04030512

10

1387

0458 9874

2R

1388

0459 D113 (0460)

6

1389

045A FCOA1F29

10R

1390

045C F04800C8

18

1391

045E D016 (0465)

22

1392

045F 8400

6R

1393

0460 F8190020

10

1394

0462 D031 (0464)

14

1395

0, RAM_H+4

CLAD

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CLAD

*

R6=NAV MODE

R7=TEMP

R8=X(B)D

R9=DELTA T(B)D

RC=3D COUNTER

RD=END 3D COUNTER

* START TRACKING FILTER MEASUREMENT UPDATE
* USE BURST PHASE AND VARIANCE TO UPDATE
* THE TRACKING FILTERS OF THE THREE STATIONS
* THAT JUST TRANSMITTED DURING THE LAST BURST

\$3

FET
MEASUREMENT_UPDATE;

044A C08D

22R

1377

044B F44A0085

8R

1378

044D A42D

10

1379

044E A63F

16

1380

044F 4442

20

1381

8,13

CLA

*

0450 B047

22

1382

0451 D022 (0454)

26

LINE	MOD	36	05/18/76	AM/BRN-7	CLA	0,,HX0080	0,,C,,I_STATUS_	0,,HX0080	0,,HX0080	PAGE	70
1396	6R	0463	9E5C	(00DC)					"CHANGE SET UP TO TURN LAMP ON	TF023550	
1397	3R	0464	741F	(009F)	*				"BECAUSE THE BASE STATION IS WEAK	TF023560	
1398	10R	0465	F9481F78		\$83				"LAMP FOR C/I PROGRAM	TF023570	
1399	20	0467	F8040CCD		*				"COMPUTE H BURST"	TF023580	
1400	30	0469	FD481F78		\$84				"	TF023590	
1401	42	0468	F9471F78						"H BURST(NEW) = H BURST	TF023600	
1402	9R	046D	AF73		*				" + .1*(H RAW - H BURST)	TF023610	
1403	16	046E	COL1		\$13				" SCALED B3	TF023620	
1404	20	046F	D0D2	(0472)					"READ BURST PHASE PB FOR THIS	TF023630	
1405	10R	0470	F981F1F		*				"STATION AND FREQUENCY	TF023640	
					*				"IS THIS PHASE	TF023650	
					\$15				"DIFFERENCE NAVIGATION?"	*1023660	
					*				"SUB ALWAYS PHASE DIFFERENCE	TF023670	
					*				"	TF023680	
					*				"SUBTRACT LAST BURST PHASE FROM	TF023690	
					*				"BASE STATION FOR THIS FREQ FROM	TF023700	
					*				"PB	TF023710	
1406	12R	0472	7F95		\$10				"SAVE NEW PB FOR THIS FILTER	TF023720	
1407	24	0473	C872		*				"	TF023730	
1408	32	0474	COL1						"READ BURST PHASE VARIANCE SB FOR	TF023740	
1409	34	0475	9401						"THIS STATION AND FREQUENCY	TF023750	
					*				"COMPUTE SB + (.005 C)**2	TF023760	
					*				"NOTE - SB + (.005 C)**2 WILL BE	TF023770	
					*				" A NEGATIVE NUMBER IF IT	TF023780	
					*				" EXCEEDS 1 C**2 WHICH IS	TF023790	
					*				" USED AS A MARKER INDICA-	TF023800	
					*				" TING AN INVALID MEASURE-	TF023810	
					*				" MENT	TF023820	
1410	38	0476	D053	(047A)	*				"IS THIS A VALID MEASUREMENT?	TF023830	
1411	4R	0477	D0D2	(047A)	*				"IS THIS PHASE	*1023840	
1412	10R	0478	FD891F19		*				"DIFFERENCE NAVIGATION?"	*1023850	
					*				"SUB ALWAYS PHASE DIFFERENCE	TF023860	
					*				"ADD LAST BURST PHASE VARIANCE	TF023870	
					*				"FROM BASE STATION FOR THIS FREQ	TF023880	
					*				"TO SB	TF023890	
1413	12R	047A	7F86		\$11				"SAVE NEW SB FOR THIS FILTER	TF023900	
1414	20	047B	FG6800C8		*				"	TF023910	
1415	24	047D	D015	(0483)	*				"IS THIS STATION	TF023920	
1416	14R	047E	FD971F19						"THE BASE STATION?"	*1023940	
1417	26	0480	F9771F1F						"SAVE PB AND SB OF THE BASE	TF023950	
									"	TF023960	
									"	TF023970	

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1418	30	0482	DC01	(0484)	BUC	\$12	"STATION FOR USE DURING THE NEXT	TF023960
1419	10R	0483	D710	\$14	PRN	1	"10 SECONDS	TF023990
1420	4R	0484	4443	\$12	MPIM	4,3	"ADJUST REGISTERS	TF024000
1421	6	0485	B447	\$101	ADD	4,7	"DEVELOP POINTER TO DATA FOR	TF024010
1422	2R	0486	A464		CLA	6,4	"THIS TRACKING FILTER	TF024020
1423	8	0487	9E32	(0082)	CLA	0,1	"INCREMENT TIME COUNTER USED IN	% 024030
1424	10	0488	9401	(0082)	ADD	0,1	"BASE STATION SELECTION	TF024050
1425	18	0489	7032	(0082)	STA	0,1	"READ THE TRACKING FILTER START	TF024060
1426	24	048A	9E33	(0083)	CLA	0,1	"MARKER WHICH IS SET TRUE BY THE	%S024070
							"BASE STATION SELECTION ROUTINE	TF024080
							"AFTER ENOUGH TIME HAS ELAPSED TOTF024100	TF024090
							"COLLECT BASE STATION DATA SO	TF024110
							"THAT THE MEASUREMENTS ARE VALID	TF024120
							"IS THE TRACKING	*1024130
1427	28	048B	D012	(048E)	BNE	\$21	"FILTER START MARKER TRUE?"	TF024140
1428	6R	048C	C40C0512		BCT	\$9	"IS THIS PHASE	*2024150
1429	8R	048E	AFD7				"DIFFERENCE TRACKING?"	TF024160
							"(NO MEASUREMENT)	TF024170
								*H024180
1430	14	048F	04050512		BRL	\$9	"READ SB FOR THIS FILTER	TF024190
1431	4R	0491	AC20				"NEGATIVE SB IS A MARKER INDICA-	TF024200
							"TING NO MEASUREMENT	TF024210
							"IS THIS A VALID MEASUREMENT?"	%R024220
								*H024230
							SIGMA SQ PHI M	TF024240
							"COMPUTE THETA, SCOTM AND SB+S	TF024250
							"SCALED PI, 2C**2 AND 2C**2	TF024260
							"RESPECTIVELY FOR PR AND SAVE	TF024270
							"FOR USE IN UPDATING P	TF024280
1432	12	0492	AFS6		CLAD	IX11,6	SIGMA SQ PHI PHI SCALED (2PI)**2	TF024290
							"WHERE THETA = PB - P +	TF024300
							"(PRDR**F + PR)*(0.425)	TF024310
							"THETA IS THE DIFFERENCE BETWEEN	TF024320
							"THE MEASURED AND ESTIMATED PHASE	TF024330
							"F = RATIO OF THIS FREQ TO 13.6	TF024340
							SIGMA SQ PHI PHI SCALED(B+3)PI**2	TF024350
1433	22	0493	F804+000		RSAD	0,1	"THE 0.425 IS AN AVERAGE VALUE	TF024360
							"EQUIVALENT TO 1/2 THE BURST TIME	TF024370
							"TO CORRECT THE ESTIMATED PHASE	TF024380
							"FROM THE END OF BURST TO THE	TF024390
							"MIDPOINT OF THE BURST	TF024400

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1434	32	0495	F8244000	RSAD	2,1	SIGMA SQ PHI M SCALED (B+3)PI**2	TF024410
1435	36	0497	BC20	ADD	2,0		TF024420
1436	44	0498	AFA6	CLAD	IX10,6	SIGMA SQ PHI PHI DOT SCALED 2PI	TF024430
1437	64	0499	F8061A94	MPYD	0,,=DF((10)/3.141592658+2) DELTA TM SCALED 4PI	TF024440	
1438	94	049B	F05C1701	FET	5,,TF_PHI_DATA_ADDRESSES	TF024450	
1439	102	049D	AF83	CLAD	IX11,3	PHI DOT DR SCALED B-1	TF024460
1440	122	049E	F5D61768	MPYD	IX13,,TF_LAMBDA_CONSTANT TABLE	TF024470	
1441	130	04A0	BFC4	ADD	IX12,4	PHI DOT ESTIMATE SCALED 8-1	TF024480
1442	150	04A1	F8061A96	MPYD	0,,=DF((.425)/3.141592658+1) K/2PI	TF024490	
1443	154	04A3	ACA4	CLAD	10,4	PHI AND PHI DOT ESTIMATE ADDR	TF024500
1444	158	04A4	AC40	CLAD	4,0	SUM OF PHI DOT AND PHI DOT DR K	TF024510
1445	166	04A5	AFBC	CLAD	IX11,12	PHI ESTIMATED SCALED(8+11)PI	TF024520
1446	174	04A6	46E0 (00E0)	MPID	0,,HX0800	RESCALED TO PI	TF024530
1447	178	04A7	B840	SUBD	4,0	PHI ESTIMATED	TF024540
1448	188	04A8	FDDALEED	CLAD	IX13,,PHI_SUB_M		TF024550
1449	192	04AA	BC40	ADD	4,0	THETA SCALED PI	TF024560
1450	208	04AB	C059	FET	5,9		TF024570
1451	238	04AC	F4570085	PTR	5,,TF_TEMP THETA, SIGMASQ PHI PHI DOT(DELTM), SUM	TF024580	
1452	252	04AE	D730	PRN	3	OF 1/2(SIGMASQ PHI M+PHI PHI)	TF024590
1453	256	04AF	B842	SUBD	4,2	SIGMA SQ PHI PHI DOT(DELTA TM)	TF024600
						"SET UP ARGUMENTS FOR L ALPHA	*5024610
						"SUBROUTINE	TF024620
						"THETA	TF024630
						"B = SCDTM	TF024640
						"A = L3 = SB + S - SCDTM ARG 3	TF024650
						"COMPUTE ALPHA 2 SCALED PI	*I024660
1454	264 *	0480	F80D0518	BSV	L_ALPHA	"AND L2 SCALED 1	TF024670
1455	284	04B2	F8261A98	MPYD	2,,=DF((3.141592658+1)/10) L2 SCALED PI/8-1	TF024680	
1456	304	0484	F8061A98	MPYD	0,,=DF((3.141592658+1)/10) ALPHA 2/DELTA TM SF	8TF024690	
1457	312	0486	BFF4	ADD	IX6,4	"UPDATE PRM	TF024700
						"	TF024710
						"PR(NEW) = PR + ALPHA 2/DTM	TF024720
						"	TF024730
1458	322	04B7	7B64	STAD	IX6,4	SCALED 1/4PI CYCLE/SEC	TF024740
1459	326	04B8	D021 (048A)	BGE	\$103		HH024750
1460	4R	0489	A800	CLSD	0,0		HH024760
1461	4R	048A	F8094000	COMM	0,,X(4000)	4 CEC/SEC LIMIT	HH024770
1462	8	048C	D052 (048F)	BRL	\$104		HH024780
1463	4R	048D	B800	SUBD	0,0		HH024790
1464	14	048E	7B64	STAD	IX6,4		TF024800
							TF024810
							TF024820
							TF024830
				</			

RO=PHI DOT ESTIMATE
R2=L2

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1465	8R	048F ABA6	CLSD	IX10,6	-SIGMA SQ PHI DOT SCALED 2PI	TF024840
1466	24	04C0 6802	MPYD	0,2	L2	TF024850
1467	32	04C1 8F96	ADD	IX9,6	SIGMA SQ PHI DOT PHI DOT SF B+1	TF024860
1468	62	04C2 F05C0085	FET	5,TF_TEMP	"UPDATE SR"	TF024870
1469	78	04C4 6848	MPYD	4,8	"SR(NEW) = SR +(SB+SI(L2/DTM)**2	TF024880
1470	94	04C5 6848	MPYD	4,8	" -2(L2/DTM)SC SCALED 1/2PI**2	TF024890
1471	98	04C6 8C46	ADD	4,6	SIGMA SQ PHI DOT PHI DOT(K+1)	TF024900
1472	102	04C7 D072 (04CA)	BNC	\$2	"IS SR GREATER	TF024910
1473	108	04C8 FC4A00F3	CLAD	4,,-DX(7FFFFF)	"THAN 1/2PI**2 (C/S)**2?"	TF024920
1474	4R	04CA AC60	CLAD	6,0	"SET SR = 1/2PI**2	TF024930
1475	18	04C8 D730	PRN	3	THETA	TF024940
1476	28	04CC 7888	STAD	IX11,8	RELEASE FOUR REGISTERS	TF025070
1477	38	04C3 D710	PRN	1	"SAVE SR(NEW)"	TF025080
1478	54	04CE C05D	FET	5,13	RELEASE TWO REGISTERS	TF025090
1479	62	04CF AFD5	CLAD	IX13,5	"SET UP ARGUMENTS FOR L ALPHA	TF025110
1480	66	04D0 AC40	CLAD	4,0	"SUBROUTINE	*S025120
1481	74	04D1 AFC3	CLAD	IX12,3	"THETA	TF025130
1482	78	04D2 AC20	CLAD	2,0	ARGUMENT 1	TF025140
1483	90	04D3 C035	FET	3,5	ARGUMENT 2	TF025150
1484	120	04D4 F4570085	PTR	5,TF_TEMP	ARGUMENT 3	TF025160
1485	128	04D6 C015	FET	1,5	"B = S	TF025170
1486	136 *	04D7 F80D051B	BSV	L_ALPHA	"A = SB	TF025180
1487	146	04D9 F8040010	RSAD	0,11	SIGMA SQ PHI M SCALED(2PI)**2	TF025190
					SIGMA SQ PHI PHI SCALED(2PI)**2	TF025200
					SIGMA SQ PHI PHI,PHI M,PHI PHI	TF025210
					THETA	TF025220
					"COMPUTE ALPHA 1 SCALED PI	TF025230
					"AND L1 SCALED 1	*I025240
					ALPHA 1 SCALED(B+11)PI	TF025250
						TF025260

1488	154	0408	8FA9	MOD 36	05/18/76	AN/ARN-7	IX10,9	"UPDATE P"	PAGE 74
1489	164	040C	78A9	*			IX10,9	"	TF025270
1490	168	040D	AC42	*			4,2	"P(NEW) = P + ALPHA I	TF025280
1491	178	040E	F8444000				4,1	" SCALED 810 CYCLES	TF025290
1492	188	04E0	F8491A9A				4,1	L1 SCALED B+1	TF025300
1493	198	04E2	F9AA1E03				4,1	L1 SCALED B+1	TF025310
1494	228	04E4	F05C0085				4,1	(L1-1) SCALED B+1	TF025320
1495	244	04E6	6828				4,1	(L1-1) SCALED B+1	TF025330
1496	260	04E7	684C				4,1	X10,1 SIGMA_SQ PHI DOT	TF025340
1497	276	04E8	68C2				4,1	SIGMA SQ PHI PHI PHI M, PHI PHI	TF025350
1498	292	04E9	6882				4,1	L1 SCALED B+0	TF025360
1499	296	04EA	6C64				4,1	L2 SCALED PI/8-1	TF025370
1500	312	04EB	686A				4,1	L1 SIGMA SQ PHI M	TF025380
							4,1	L2 SIGMA SQ PHI PHI	TF025390
							4,1	L1-1	TF025400
							4,1	"COMPUTE SC"	TF025410
							4,1	"	TF025420
							4,1	"SC(NEW) = (1-L1)(SC-(L2/DTM)S)	TF025430
							4,1	" + L1L2S9/DTM	TF025440
							4,1	" SCALED 1/2PI IN C**2/SEC	TF025450
							4,1	"	TF025460
							4,1	"COMPUTE FIRST TERM OF S	TF025470
							4,1	" = S(1-L1)**2	TF025480
							4,1	SIGMA SQ PHI PHI DOT(K+1)	TF025490
							4,1	(L1-1) SCALED B+1	TF025500
							4,1	(L1-1) SIGMA SQ PHI PHI	TF025510
							4,1	"IS THE FIRST	TF025520
							4,1	"TERM OF S GREATER THAN 1 C**2?	TF025530
							4,1	"TOD BIG"	TF025540
							4,1	"COMPUTE S"	TF025550
							4,1	"	TF025560
							4,1	"S(NEW) = S(1-L1)**2 + S811**2	TF025570
							4,1	"IS S GREATER THAN 1 C**2?	TF025580
							4,1	"SET S = 1 C**2	TF025590
							4,1	"SAVE S(NEW)"	TF025600
							4,1	SIGMA SQ PHI PHI SCALED (2PI)**2	TF025610
							4,1	"	TF025620
							4,1	SIGMA SQ PHI PHI DOT SCALED 2PI	TF025630
							4,1	SAVE INDEX	TF025640
							4,1	"	TF025650
							4,1	"	TF025660
							4,1	"	TF025670
							4,1	"	TF025680
							4,1	"	TF025690

MOD	36	05/18/76	AN/BRN-7	CLA	IX12.6	N COUNTER	PAGE
1519	24	0500	ATC6	COMD	1,,=DF(.0009)	(.00P1)**2	77
1520	34	0501	F8181A9C	COMD	1,,=DF(.0009)	(.00P1)**2	77
					* MEASUREMENT UPDATE IS NOW COMPLETE		
					* NOW CONSIDER IF VARIANCES ARE		
					* SUFFICIENTLY SMALL TO INDICATE		
					* GOOD TRACKING TO KALMAN		
1521	38	0503	D038 (050F)	BRG	\$7	"IS S LESS THAN (.003 C)**27	*025700
1522	12R	0504	C894	FETD	IX9.4	SR	*025710
1523	22	0505	F8081A9E	COMD	0,,=DF(.09*.09D-4*3.1415926**2)		*025720
1524	32	0507	D710	PRN	1		*025730
1525	36	0508	D036 (050F)	BRG	\$7	"IS SR LESS THAN (.0009 C/S)**27	*025740
1526	2R	0509	9401	ADDM	0,,1	"TRACKING IS GOOD"	*025750
						"INCREMENT N COUNTER BY 1	*025760
						"(WHEN N=3 KALMAN CAN TAKE DATA)	*025770
						CUT N OFF AT 7	*025780
1527	10	050A	E4100008	EXT	1,0,HX0008		*025790
1528	14	050C	D064 (0511)	BRG	\$8	"IS N LESS THAN 8"	*025800
1529	2R	050D	9001	SUBM	0,,1	"DECREMENT N BY 1 SO THAT IT WILL	*025810
						NEVER EXCEED 7 THIS IS FOR THE	*025820
1530	6	050E	D002 (0511)	BUC	\$8	"CONVENIENCE OF THE C/I PROGRAM	*025830
1531	8R	050F	E400010E	EXT	0,0,HXFF00	"TRACKING IS POOR"	*025840
						"SET N COUNTER = 0	*025850
1532	9R	0511	73C6	STA	IX12.6	"SAVE THE N COUNTER"	*025860
						"NOTE - THE 8 HIGH ORDER BITS OF	*025870
						THE N COUNTER WORDS ARE	*025880
						USED BY KALMAN TO COUNT	*025890
						THE NUMBER OF DUMPS	*025900
						"HAVE ALL 3"	*025910
1533	10R	0512	FC7C044B	BXUD	7,, MEASUREMENT_UPDATE	"MEASUREMENTS BEEN"	*025920
						"PROCESSED?"	*025930
1534	22R	0514	F03C1F25	FET	3,, RAW_H	"MOVE RAW H(13.6) TO RAW H (11.3)	*025940
						"MOVE RAW H(10.2) TO RAW H (13.6)	*025950
						"SET RAW H(10.2) = 1	*025960
						"RAW H(11.3) NOW CONTAINS Q(10.2)	*025970
						"Q(13.6) FOR THE STATION THAT	*025980
						"WILL TRANSMIT 11.3 DURING THE	*025990
						"NEXT BURST. RAW H(13.6) NOW	*026000
						"CONTAINS Q(10.2) FOR THE STATION	*026010
						"THAT WILL TRANSMIT 13.6 DURING	*026020
						"THE NEXT BURST. END BURST WILL	*026030
1535	34	0516	86F3 (00F3)	FETD	0,,=DX(7FFFFF)	"COMPUTE NEW Q'S FOR EACH FREQ	*026040
						"AND MULTIPLY THEM BY THE	*026050
						"APPROPRIATE RAW H."	*026060
1536	64	0517	FC471F25	PTRD	4,, RAW_H		*026070

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TF026130
TF026140

RELEASE FIFTEEN REGISTERS

MOD 36 05/18/76 AM/BRN-7
PRN 14
B8K 11

0519 07E0
051A 0580

100
134

1537
1538

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**	TRACKING FILTER L ALPHA SUBR		TF026150
**	CALLING SEQUENCE BSV L_ALPHA		TF026160
*	ENTER WITH THETA SCALED PI IN R0,1		TF026170
*	B SCALED N IN R2,3		TF026180
*	A SCALED N IN R4,5		TF026190
*	RETURN WITH ALPHA SCALED PI IN R0,1		TF026200
*	L SCALED B+0 IN R2,3		TF026210
*	TWO REGISTERS PRUNED		TF026220
*	L ALPHA SUBROUTINE		*H026230
*			*H026240
*	THIS ROUTINE WILL ACCEPT 3 ARGUMENTS (THETA, B AND A)		*H026250
*	AND RETURN ALPHA AND L		*H026260
*			*H026270
*			TF026280
	L_ALPHA	SINCOS	"SIN(ALPHA) = B * SIN(THETA)
	0518 1400	0,0	"COS(ALPHA) = A + B * COS(THETA)
	051C C057	5,7	"NUMERATOR OF L = (A * COS(THETA)
			" + B) * B
			"
			"DENOMINATOR OF L =
			"(B * COS(THETA) + A)**2
			" + (B * SIN(THETA))**2
			"
			SIN THETA
			COS THETA
			1/2A
			B
			1/2B
			1/2A
			1/2A+B COS THETA
			B SIN THETA
			(B COS THETA+1/2A)**2
			(B SIN THETA)**2
			1/2 B
			12,2
			"COMPUTE ABSOLUTE VALUE OF
			"NUMERATOR
			ABSOLUTE VALUE
			\$1
			4,12
			\$2
			4,12
			4,6
			\$3
			"WILL THE DIVIDE OVERFLOW?"
			\$R026570

[illegible]

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\$S026660
 \$H026670
 \$H026680
 \$H026690
 \$H026700
 \$H026710
 \$H026720
 \$H026730
 \$I026740
 \$S026750
 \$S026760
 \$I026770
 \$S026780
 \$S026790
 \$S026800
 \$S026810
 \$S026820
 \$S026830
 \$S026840
 \$S026850
 \$S026860
 \$S026870
 \$S026880

THIS IS AN OMEGA TASK THAT IS EXECUTED AT THE START OF
THE .1 SECOND SLOT DATA COLLECTION PERIOD. THIS PROGRAM
CLEARS THE 6 SIN/COS REGISTERS AND MONITORS FOR A
PRECISION FREQUENCY GENERATOR FAILURE

*I026740

SSQ26750

SS026760
 *1026770
 SS026780
 SS026790
 SS026800
 SS026810
 SS026820
 SS026830
 SS026840
 MT026850
 SS026860
 SS026870
 SS026880

25026880

PLOT16 288K FILE

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END OF SLOT

* THIS IS AN OMEGA TASK THAT IS EXECUTED AT THE CONCLUSION OF
* THE SLOT .1 SECOND DATA COLLECTION PERIOD WHICH SHOULD BE
* THE EXACT CENTER OF THE SLOT. THIS ROUTINE PERFORMS ANTENNA
* SELECT FOR THE STATION BURSTS, COMPUTES SCALE FACTORS AND
* MAKES NOISE AND PHANTOM MEASUREMENTS.

1574	12R	0544	86A8	(00A8)	END_OF_SLOT	FETD	0,,TIME_INC
1575	16	0545	8C02		ADD	0,,2	
1576	28	0546	7C3C	(008C)	PTRD	0,,TIME	
1577	36	0547	8410		FETM	1,,0	

1578	48	0548	7C28	(00A8)	PTRD	0,,TIME_INC
------	----	------	------	--------	------	-------------

1579	118	0549	0805		OMEGA	0,,START_BURST-OMEGA_TASK_TABLE/2
------	-----	------	------	--	-------	-----------------------------------

* NOTE - THE NEXT TASK WILL OCCUR .145
* OR .155 SEC LATER WHENEVER
* THERE IS A TIME CORRECTION

1580	152	054A	F06C0011		FET	6,,COS_10_2
------	-----	------	----------	--	-----	-------------

1581	160	054C	8412		FETM	1,,2
------	-----	------	------	--	------	------

1582	178	054D	F02C0083		FET	2,,STATION_COUNTER-2
------	-----	------	----------	--	-----	----------------------

1583	2R	054F	A402	\$3	CLA	0,,2
------	----	------	------	-----	-----	------

1584	4	0550	9401		ADD	0,,1
------	---	------	------	--	-----	------

1585	6	0551	9808		COMM	0,,8
------	---	------	------	--	------	------

1586	10	0552	D011	(0554)	BNE	\$11
------	----	------	------	--------	-----	------

1587	2R	0553	9C00		CLAM	0,,0
------	----	------	------	--	------	------

1588	2R	0554	8003	\$11	SUB	0,,3
------	----	------	------	------	-----	------

1589	6	0555	D021	(0557)	BGE	\$1
------	---	------	------	--------	-----	-----

1590	2R	0556	9408		ADD	0,,8
------	----	------	------	--	-----	------

1591	4R	0557	4406	\$1	MPIM	0,,6
------	----	------	------	-----	------	------

1592	10	0558	967E	(00FE)	ADD	0,,SV_ADD
------	----	------	------	--------	-----	-----------

1593	18	0559	F4081F6F		FETM	0,,R21
------	----	------	----------	--	------	--------

* COMPUTE RELATIVE BEARING FROM

*1027310

GET K-J MOD 8

PER STATION IN TABLE

READ OMEGA DATA AND GET 1 REGISTERS
"READ SLOT SIN/COS DATA BEFORE
"NEXT DMA UPDATE
"SET UP 3 COUNTER TO CYCLE
"ANTENNA SELECT FOR 3 FREQ
"COUNTER-2 READ K AND GET 2 REGISTERS
STATION NUMBER
INCREMET STATION COUNTER TO
NEXT STATION
"USE STATION COUNTER AND FREQ TO
"DETERMINE NEXT STATION TO
"TRANSMIT THIS FREQ
* 027230
ES027230
* 027240
ES027240
* 027250
ES027250
* 027260
ES027260
* 027270
ES027270
* 027280
ES027280
* 027290
ES027290
* 027300
ES027300
*1027310

1594	26	*	0558	F8001605	MOD 36	05/18/76	AN/BRN-7	ESV	BEARING	"R3 AXIS TO STATION (CW)	ES027320
1595	32		0550	9240 (00C0)	*			SUB	0,,THETA_P	"BEARING FROM +A LOOP TO STATION	ES027330
1596	38		055E	9242 (00C2)	*			SUB	0,,PSI_A	"= REL BEARING - THETA P - PSI A	ES027340
					*					" - 180 DEG	ES027350
					*					"ADD 45 SO THAT 45 WILL BE MID-	ES027360
					*					"POINT OF QUADRANT IN WHICH THE	ES027370
					*					"A LOOP IS SELECTED	ES027380
1597	42		055F	F409A000	*			ADDM	0,,X(A000)	45 + 180	ES027390
1598	52		0561	F00C1F8C	*			FET	0,,FLOATER	"READ STATE OF THE ANTENNA"	*1027400
1599	60		0563	D700	*			PRN	0	"MARKER"	ES027410
1600	64		0564	D014 (0509)	*			BNE	\$52	"IS THE LOOP ANTENNA IN USE NOW?"	ES027420
					*					"LOOP"	*R027430
1601	6R		0565	5002	*			RSL	0,,14	"USE THE 180 AND 90 DEG BITS OF	ES027440
					*					"THE BEARING TO DEFINE THE QUAD-	ES027450
					*					"RANT FOR ANTENNA SELECT	ES027460
					*					" 0 - 90 = + A	ES027470
					*					" 90 - 180 = + B	ES027480
					*					"180 - 270 = - A	ES027490
					*					"270 - 360 = - B	ES027500
1602	14		0566	F50A1762	*			CLA	X0,,ANTENNA_SELECT_TABLE		ES027510
1603	18		0568	D004 (0560)	*			BUC	\$2		ES027520
1604	6R		0569	9662 (00E2)	\$52			ADD	0,,HX2000	"FLOATER"	ES027530
1605	12		056A	5001	*			RSL	0,,15	"ADD 45 TO THE BEARING SO THAT	ES027540
					*					"90 WILL BE THE MIDPOINT OF THE	ES027550
					*					"SEMICIRCLE IN WHICH +A IS USED	ES027560
					*					"USE THE 180 DEG BIT TO DEFINE	ES027570
					*					"THE SEMICIRCLE FOR ANTENNA USE	ES027580
					*					" 0 - 180 = +A	ES027590
					*					"180 - 360 = -A	ES027600
1606	20		0568	F50A1766	*			CLA	X0,,FLOATER_SELECT_TABLE		ES027610
1607	10R		056D	F1470020	\$2			STA	X4,,ANTENNA_SWITCHING_MATRIX_OUTPUT_10_2		ES027620
					*					"OUTPUT ANTENNA CHOICE FOR THIS	ES027630
					*					"FREQ TO ANTENNA SWITCHING MATRIX	ES027640
					*						*R027650
					*					"NOTE - WHENEVER -A OR -B IS SELECTED	*H027660
					*					"THE MATRIX IS SET TO +A OR +B	*H027670
					*					"AND A MARKER IS SET FOR THE	*H027680
					*					"END BURST ROUTINE TO ADD 180	*H027690
					*					"DEG TO THE MEASURED PHASE	*H027700
1608	20		056F	F5470035	*			PTR	X4,,ANTENNA_SELECT_SAVE	"SAVE MARKER FOR END BUREAU	*H027710
1609	28		0571	C633 (054F)	*			BXU	3,,\$3	"INDICATING + OR - LOOP CHOICE	*R027720
1610	16R		0572	D740	*			PRN	4	"HAVE ALL 3 FREQ BEEN PROCESSED?"	*R027730
					*						*027740

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1611	8R	0573	F46A00B5	*	6., STATION_COUNTER	ES027750
				\$4	"USE LSB OF STATION COUNTER TO	ES027760
				*	"DETERMINE IF THIS IS A CALIBRATEE	ES027770
				*	"OR NOISE MEASUREMENT SLOT	ES027780
1612	16	0575	E46600D5	*	"DO CALIBRATE FOLLOWING A,C,E,G	ES027790
1613	22	0577	040105EF	*	"IS THIS A NOISE SLOT?"	ES027800
1614	8R	0579	F46A00B5	*	"SAVE THE SLOT SIN/COS DATA	ES027810
				*	"USE STATION_COUNTER (=0,2,4,6)	ES027820
				*	"TIMES 3 AS A POINTER TO SAVE THEE	ES027830
				*	"6 PIECES OF DATA AT EACH SLOT	ES027840
				*	"THE DATA IS A Y AND X (COS/SIN)	ES027850
				*	"FOR EACH FREQ	ES027860
				*	"1ST SET = C3 (TEST +90)	ES027870
				*	"2ND SET = C2 (-TEST)	ES027880
				*	"3RD SET = C1 (TEST)	ES027890
				*	"4TH SET = C4 (-TEST + 90)	ES027900
1615	12	0578	4463	*	ALSO SAVE ALL 4 SETS IN THE C4	ES027910
				*	AREA FOR MAGNETIC TAPE	ES027920
				*	6., CALIBRATE_DATA	ES027930
1616	16	057C	F4891EF6	*	5., CALIBRATE_DATA+18	ES027940
1617	46	057E	F4571F08	*	5., CALIBRATE_DATA+18	ES027950
1618	76	0580	F05C1F08	*	15, 6	ES027960
1619	104	0582	7656	*	SAVE CALIBRATE DATA	ES027970
1620	108	0583	F8091F08	*	0., CALIBRATE_DATA+18	ES027980
				*	"IS THIS THE 4TH	ES027990
1621	114	0585	040105E4	*	NUT_FOURTH_ITERATION "SET OF DATA IN A 10 SEC	*208000
				*	"PERIOD?"	ES028010
1622	6R	0587	9E78 (00F8)	*	0., CAL_R_ADD	ES028020
1623	18	0588	86EF (00EF)	*	0., =DF(.18+1)	ES028030
1624	26	0589	8415	*	1., 5	ES028040
				*	DELTA T CALIBRATE 8-1	ES028050
				*	"SET UP 6 COUNTER TO PROCESS THE	ES028060
1625	64	058A	F07C177D	*	"6 PIECES OF DATA	ES028070
1626	2R	058C	9C10	\$7	"COMPUTE BIAS"	ES028080
1627	8	058D	A786	*	"BIAS = (C1 + C2 + C3 + C4)/.1	ES028090
1628	14	058E	8785	*	X OR Y C2	ES028100
1629	20	058F	8784	*	X OR Y C3	ES028110
1630	26	0590	8787	*	X OR Y C4	ES028120
1631	152	0591	DC0A	*	8 AT 814	ES028130
1632	158	0592	81C0	*	NEW-OLD	HH028140
1633	164	0593	F0043666	*	200 SECOND TIME CONSTANT FILT	HH028150
1634	170	0595	85C0	*	OLD+(NEW-OLD)*.05	HH028160
1635	178	0596	71C0	*		HH028170

1636	182	0597	0021	(0599)	MOD 36	05/18/76	AN/BRN-7	12	028180	PAGE 8
1637	2R	0598	A000				BGE	\$12	*GET ABSOLUTE VALUE OF BIAS	
1638	4R	0599	F80901F4		\$12		CLS	0,0	SLGW CORRELATOR	
1639	8	0599	D053	(059F)			COMM	0,, F(2508-14)	*IS BIAS LESS THAN 250 COUNTS/SEC	
1640	2R	059C	9C01				BRL	\$10		
1641	10	059D	F80005E5		*		CLAM	0,,1	*INDICATE RECEIVER MALF FOR THIS	
1642	2R	059F	9C10				BSV		*FREQ AND TURN ON MALF LAMP	
1643	8	05A0	A786		\$10		CLAM		REC_ERROR	
1644	14	05A1	B385				CLA	1,,0	*NOTE - BIAS NOT USED IN SYSTEM EQUATIONS	
1645	30	05A2	B800				SUB	IX8,6	*COMPUTE SCALE FACTOR	
1646	34	05A3	AC20				MPVD	IX8,5	"SF = (C1 - C2)**2	
1647	36	05A4	9C10				CLAD	0,0	" + (C3 - C4)**2)**.5/.1	
1648	42	05A5	A784				CLAM	2,0	*SAVE SF FOR NOISE, BURST AND	
1649	48	05A6	B387				CLAM	1,,0	*PHANTOM	
1650	64	05A7	B800				SUB	IX8,4	CLEAR	
1651	68	05A8	BC02				MPVD	IX8,7	X OR Y C3	
1652	514	05A9	I000				ADD	0,0	X DR Y C4	
1653	640	05AA	DC0A				SQRT	0,2	SQUARE	
1654	644	05AB	BC00				DIVD	0,10	SUM	
1655	652	05AC	71C6				ADD	0,0	A*DT AT B14	
1656	656	05AD	F0090C80				STA	0,12,6	SF AT B14	
1657	660	05AF	0021	(0581)			SUBM	0,, F(16008-14)	*FORM ABSOLUTE(SF-NOMINAL SF)	
1658	2R	0580	A000				BGE	\$20	" NOMINAL SF = 1600 COUNTS/SEC	
1659	4R	0581	F80903E8		\$20		CLS	0,0		
1660	8	0583	D057	(0588)	*		COMM	0,, F(5008-14)	"IS THE SF"	
1661	8R	0584	F58A1C18				BRL	\$80	"DEVIATION LESS THAN	
1662	10	0586	9805				CLA	X8,, CALIBRATE_FAIL_COUNT		
1663	14	0587	D055	(058D)			COMM	0,,5		
1664	6R	0588	9E50	(000D)	*		BRL	\$81	"500 COUNTS/SEC?	
1665	14	0589	F80005E5				CLA	0,,HX0100	"INDICATE RECEIVER MALF FOR THIS	
1666	2R	058A	B00Q		\$80		BSV		*FREQ AND TURN ON MALF LAMP	
1667	6	058C	D001	(058E)			SUB	0,0	REC_ERROR	
1668	2R	058D	9401		\$81		SUC	\$82		
1669	10R	058E	F1871C18		\$82		ADD	0,,1		
1670	2R	05C0	94C1		\$21		STA	X8,, CALIBRATE_FAIL_COUNT		
1671	10	05C1	C786	(058C)	*		ADD	12,,1	"INCREMENT POINTER"	
1672	2R	05C2	9C92				BYU	8,,57	"HAVE ALL 6 SETS	
							CLAM	9,,2	"OF DATA BEEN PROCESSED?"	
									"SET UP 3 COUNTER TO COMPUTE	

MOD	36	05/18/76	AN/BRN-7	CLAM	10,0	"PHI ZERO FOR EACH FREQ	PAGE 84
1673	4	05C3	9CA0	CLAM	10,0	"PHI ZERO FOR EACH FREQ	ES028610
1674	6	05C4	9C10	CLAM	1,0	"COMPUTE PHI ZERO	ES028620
1675	6R	05C5	A7A7	CLA	IX10,7	"= ATAN (YC4-YC3+XC1-XC2) /	ES028630
1676	12	05C6	B3A4	SUB	IX10,4	" (XC3-XC4+YC1-YC2)	ES028640
1677	14	05C7	94A1	ADDM	10,1	" + PHI ZERO 0 (= SUBMARINE	ES028650
1678	20	05C8	B7A6	ADD	IX10,6	" COUPLER SHIFT)	ES028660
1679	26	05C9	B3A5	SUB	IX10,5	" + PHI ZERO LOOP OR FLOATER	ES028670
1680	30	05CA	AC20	CLAD	2,0	"	ES028680
1681	36	05CB	A7A4	CLA	IX10,4	"NOTE - PHI ZERO NOT REQUIRED FORES028700	ES028690
1682	42	05CC	B3A7	SUB	IX10,7	" PHASE DIFFERENCE TRACKINGS028710	ES028700
1683	44	05CD	90A1	SUBM	10,1	DECREMENT INDEX	ES028720
1684	50	05CE	B7A6	ADD	IX10,6	YC1	ES028730
1685	56	05CF	B3A5	SUB	IX10,5	YC2	ES028740
1686	58	05D0	94A2	ADDM	10,2	INCREMENT ADDRESS	ES028750
1687	596	05D1	1800	ATAN	0,0		ES028760
1688	604	05D2	F56B17C8	ADD	X6, PHI_ZERO_0	"READ STATE OF THE ANTENNA	ES028770
1689	614	05D4	F00C1F8C	FET	0, FLOATER	"MARKER"	*I028780
1690	622	05D6	D700	PRN	0		ES028790
1691	626	05D7	D063 (050B)	BRE	\$37	"IS THE LOOP ANTENNA IN USE?	ES028800
1692	8R	05D8	F56B17CE	ADD	X6, PHI_ZERO_FLOATER	"USE PHI ZERO FLOATER	ES028810
1693	12	05DA	D002 (050D)	BUC	\$38		ES028820
1694	8R	05DB	F56B17D1	ADD	X6, PHI_ZERO_LOOP	"USE PHI ZERO LOOP (AND ACU144ES028830	ES028830
1695	10R	05DD	F1671EF3	STA	X6, PHI_ZERO	COUPLER SHIFT)ES028850	ES028850
1696	18	05DF	8410	FETM	1,0	"SAVE PHI ZERO (IN CASE USING	ES028860
1697	26	05E0	C58C (05C5)	BXU	8,18	RHO-RHO NAV)	ES028870
1698	2R	05E1	9C01	CLAM	0,1	RESTORE PRN 2 IN ARC TAN	ES028880
1699	10	05E2	701A (009A)	STA	0, CALIBRATE_COMPUTED_MARKER "START	"HAVE ALL 3 FREQ BEEN PROCESSED? *R028890	ES028890
1700	46	05E3	D5C0	BK	12	"SET CALIBRATE COMPUTED MARKER SOES028900	ES028900
1701	12R	05E4	D500	BK	0	"THAT NOISE MEASUREMENTS CAN	ES028910
1701						"EXIT - NO PROCESSING NOW	ES028920
1701							ES028930
1701							ES028940
1701							ES028950
1701							ES028960
1701							ES028970
1701							TS028980
1701							TS028990
1701							*H029000
1701							*H029010
1701							*H029020
1701							*H029030

* THIS ROUTINE IS ENTERED WHENEVER
* THE BIAS OR SCALE FACTOR ARE OUT

MOD	36	05/18/76	AN/BRN-7	* OF LIMITS.	REC_ERROR	CLA	1,8	CONVERT 6 COUNTER TO A 3 COUNTER	PAGE 85
1702	2R	05E5	A418		CLA	1,8	CONVERT 6 COUNTER TO A 3 COUNTER	4029040	
1703	8	05E6	F0144000		RSA	1,1	"COUNT NUMBER OF FAILURES	T5029050	
1704	16	05E8	F5181F8F		ADD	X1,1	"CHANNEL_FAIL	ES029060	
1705	26	05EA	F1171F8F		STA	X1,1	"CHANNEL_FAIL	T5029070	
1706	44 *	05EC	351C		MARK	X1,12	"POST ERROR TYPE IN FAILURE WORD	T5029080	
1707	62 *	05ED	2EDD (Q0DD)		FAILED	IO,1	"10.2 = BIT 13, 13.6=14, 11.3=15	*1029090	
1708	70	05EE	D5F0		BBK	15	"TURN ON MALFUNCTION LAMP	ES029100	
							"EXIT	ES029110	
								ES029120	
								ES029130	
								ES029140	
							R0 = TEMP	ES029150	
							R2 = TEMP	ES029160	
							R4 = ADDRESS OF CALIB DATA YC3	ES029170	
							R5 = ADDRESS OF CALIB DATA YC2	ES029180	
							R6 = ADDRESS OF CALIB DATA YC1	ES029190	
							R7 = ADDRESS OF CALIB DATA YC4	ES029200	
							R8 = 6 COUNTER, 3 (D) COUNTER	ES029210	
							RA = DELTA T CALIBRATE (D)	ES029220	
							RC = ADDRESS OF CALIB RESULTS (BY10-2)	ES029230	
								ES029240	
								ES029250	
								ES029260	
								ES029270	
1709	8R	05EF	F46A009A		NOT_CALIB	6,1	CALIBRATE_COMPUTED_MARKER	ES029280	
							"THE NOISE COMPUTATIONS REQUIRE	ES029290	
							"THAT THE SCALE FACTOR HAS BEEN	ES029300	
							"COMPUTED	ES029310	
							"HAS CALIBRATION	*1029320	
1710	12	05F1	0011 (05F3)		BNE	\$9	"BEEN PERFORMED YET?"	ES029330	
								ES029340	
1711	24R	05F2	0560		BBK	6	"EXIT - NO PROCESSING NOW	ES029350	
								ES029360	
								ES029370	
1712	4R	05F3	FC691F08		CLAM	6,1	NOISE_DATA	ES029380	
1713	32	05F5	7656		PTR	15,6	"SAVE SLOT DATA FOR NOISE/PHANTOMES	ES029390	
1714	46	05F6	F80C1AA0		FETD	0,1	DELTA T NOISE 8+1	ES029400	
1715	54	05F8	8678 (00F8)		FET	0,1	"SET UP 3 COUNTER FOR 3 FREQ	ES029410	
1716	62	05F9	8412		FETM	1,2	"SET UP 2 COUNTER FOR Y AND X	ES029420	
1717	82	05FA	8471		FETM	7,1	2 COUNTER + 6 REGISTERS	ES029430	
1718	2R	05FB	A442		CLA	4,2	SAVE Y**2 ON 2ND PASS	ES029440	
1719	8	05FC	A62D		CLA	12,13	"COMPUTE Y/SF = YN AT B1	ES029450	
1720	14	05FD	A5A0		CLA	X10,0	BIAS AT B14	HH029460	

MOD	36	05/18/76	AN/BRN-7	MPYM	0,,F(.05)	COUNTS PER .1 SECONDS	PAGE
1721	20	05FE F0040666		SUB	2,0	SUB BIAS FROM PHANTOM	HH029470
1722	22	0603 8020		CLA	X10,6	"COMPUTE POINTER TO PHANTOM DATA	HH029480
1723	28	0601 A5A6		DIV	2,0	"= 0 IF Y AND 3 IF X + FREQ 0,1,2	ES029490
1724	60	0602 D420		CLA	0,6	CONVERT 2 COUNTER TO 0 IF	ES029500
1725	62	0603 A406		MPIM	0,3	" ADD 6 IF STATION COUNTER = 5	ES029510
1726	66	0604 4403		ADDM	X8,Y,P	" OR 7 INDICATING 8 LOOP DATA	ES029520
1727	72	0605 F5891FA6		FET	0,,STATION_COUNTER	"THE DATA IS STORED	ES029530
1728	80	0607 8635 (0065)		RSL	0,,2	"YPA10, YPA13, YPA11, XPA10,	ES029540
1729	86	0608 F005200C		MPIM	0,,6	"XPA13, XPA11, YP810, YP813,	ES029550
1730	90	060A 4406		ADD	1,0	"YP811, XP810, XP813, XP811	ES029560
1731	92	0608 8410		CLA	0,3	"	ES029570
1732	94	060C A403		MPIM	0,,10	"YP(NEW) = YP(OLD) +	ES029580
1733	98	060D 440A		SUB	X1,0	" .001(YN/.1 - YP(CLD))	ES029590
1734	104	060E B110		MPYM	0,,F(.001)	"	ES029600
1735	110	060F FC040C21		ADD	X1,0	"FORM YN**2	ES029610
1736	116	0611 8510		PTR	X1,0	"	ES029620
1737	124	0612 7510		MPY	2,2	"THE ABOVE EQUATIONS REPEAT FOR X	ES029630
1738	130	0613 6022		ADDM	13,1	INCREMENT ADDRESS OF NOISE DATA	ES029640
1739	132	0614 9401		ADDM	10,,1	INC CALIB ADDR	ES029650
1740	134	0615 94A1		EXU	6,,\$10	"HAVE BOTH X AND Y BEEN PROCESSED	ES029660
1741	142	0616 C56C (05FB)	*				ES029670
1742	2R	0617 8442	*	ADD	4,2	"Q(T)' = (XN**2 + YN**2)/.1 AT	ES029680
1743	34	0618 D448		DIV	4,11	Q T PRIME B1	ES029690
1744	42	0619 F41A009B		CLA	1,,NOISE_COMPUTED_MARKER	"IS THIS THE 1ST TIME THROUGH?	ES029700
1745	46	061B D060 (0629)		BRE	\$48		ES029710
1746	8R	061C F58A0032	\$47	CLA	X8,,Q_SUB_T		ES029720
1747	12	061E F8490333	*	COMM	4,,F(.058-1)		ES029730
1748	16	0620 D045 (0626)	*	BLE	\$50	"IS QT GREATER	% 029740
1749	4R	0621 4449	*	MPIM	4,,9	"THAN .05? (WAS THERE A LOT OF	% 029750
1750	8	0622 F049199A		SUBM	4,,F(.4E-1)	"NOISE THIS TIME)	*2029760
1751	10	0624 A404		CLA	0,4	"MAGNIFY QT BY FORMING	*R029770
1752	14	0625 D009 (062F)		BUC	\$46	"QT = 9QT - .4	ES029780
1753	4R	0626 F8090333	\$50	COMM	0,,F(.058-1)	"TO MINIMIZE WEIGHT OF STATION	ES029790
1754	8	0628 D042 (062B)	*	BLE	\$49	"BURSTS NOW	ES029800
1755	4R	0629 FC09019A	\$48	CLAM	0,,F(.0258-1)	"LOOK FOR PREVIOUS QT LARGE	ES029810
			*			"INDICATING THAT THERE WAS A LOT	ES029820
			*			"OF NOISE BEFORE	ES029830
			*			"IS QT GREATER THAN .05?	ES029840
			*			"SET OLD QT = .025 SO THAT NEW QT	ES029850
			*			"CAN DROP SHARPLY SINCE QT IS	ES029860
			*				*R029870
			*				*R029880
			*				*R029890

AD-A050 501

NORTHROP CORP HAWTHORNE CALIF ELECTRONICS DIV
AN/BRN-7 COMPUTER PROGRAM SPECIFICATION. VOLUME
OCT 73

F/6 17/7
XIII. APPENDIX.(U)
N00039-73-C-0209

UNCLASSIFIED

NORT-73-48

NL

2 OF 4
AD
A050501

MOD	36	05/18/76	AN/BRN-7	PAGE	87
1756	2R	0628	B040	\$49	"NOW SMALL
1757	8	062C	F0440666		"FORM SMOOTHED QT WHERE
1758	10	062E	B404		"QT(NEW) = QT(OLD) + .05(QT - QT(OLD))
1759	10R	062F	F1870032	\$46	"SAVE NEW QT FOR BURST
1760	8R	0631	C787 (05FB)	\$30	"HAVE ALL 3 FREQ BEEN PROCESSED?
1761	10R	0632	F097009B	*	"SET MARKER NON ZERO
				*	"NOISE COMPUTATIONS ARE COMPLETE
				*	"AND BURST PROCESSING CAN START
1762	48	0634	D5D0	88K	ES030000
				*	ES030010
				*	ES030020
				*	ES030030
				*	ES030040
				*	ES030050
				*	ES030060
				*	ES030070
				*	ES030080
				*	ES030090
				*	ES030100

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S8030110

*H030120

*H030130

*H030140

*H030150

*H030160

*H030170

*H030180

S8030190

S8030200

S8030210

S8030220

S8030230

S8030240

S8030250

S8030260

* 030270

S8030280

S8030290

S8030300

S8030310

S8030320

S8030330

S8030340

S8030350

S8030360

S8030370

S8030380

S8030390

S8030400

S8030410

S8030420

S8030430

S8030440

* 030450

* 030460

* 030470

S8030480

S8030490

S8030500

S8030510

* 2030520

*R030530

START OF BURST

* THIS ROUTINE IS AN OMEGA TASK THAT IS EXECUTED AT THE START
* OF EACH STATION BURST DATA COLLECTION PERIOD. THE PROGRAM
* INCREMENTS THE STATION COUNTER, SETS THE TIME OF BURST AND
* PERFORMS BASE STATION SELECTION

START_OF_BURST:

FET

CLAM

0635 F03C0083

0637 9C37

22R

24

1763

1763

1764

8XU

CLA

STA

CLA

CLAM

ADD

0638 C420 (0639)

0639 F52A175A

0638 F0071F17

063D A410

063E 9C00

063F BC40

32

8R

18

20

22

26

1765

1766

1767

1768

1769

1770

STA

FETM

PTR

PRN

SUBD

OMEGA

FET

FET

BNE

COMM

BRL

0640 F0270085

0642 8450

0643 F4570011

0645 D730

0646 92EB (00EB)

0647 0806

0648 8632 (0082)

0649 864D (00CD)

064A D015 (0650)

064B F8190048

36

52

82

96

104

174

182

190

194

4R

1771

1772

1773

1774

1775

1776

1777

1778

1779

1780

064D C405068F

10

1781

* NOTE - DATA COLLECTION IS .2 SECS
* LESS THAN THE TOTAL
* STATION BURST TIME

2,,STATION_COUNTER

5,,0

5,,COS_10_2

3

0,,=01

0,,K_FILTER-OMEGA_TASK_TABLE/2

0,,START_CNT

0,,NEED_BASE

\$2

1,,1((12)*6)

\$10

"HAS 1 MINUTE ELAPSED?"

"HAS A BASE

"STATION BEEN SELECTED YET?

"ALLOW THE SYSTEM TO OPERATE FOR

"1 MINUTE AFTER SYNC BEFORE

"ATTEMPTING BASE STATION SELECT

"

MOD	36	05/18/76	AM/BRN-7	PAGE	89
1782	4R	064F D004 (0654)	BUC	\$(EXIT IF NO)	S8030540
1783	2R	0650 981C	COMM	"DO BASE STATION SELECTION	S8030550
				"REVIEW BASE STATION EVERY 10 SECS	S8030560
1784	8	0651 0405068F	BRL	"	*2030570
1785	8R	0653 7033 (0083)	STA	"HAVE 10 SECONDS ELAPSED?	*R030580
				"(EXIT IF NO)	S8030590
				"SET START MARKER TRUE TO ALLOW	S8030600
				"THE TRACKING FILTERS TO OPERATE	S8030610
				"(THE MARKER WAS ALREADY TRUE	S8030620
				"UNLESS THERE WAS A BASE STATION	S8030630
				"CHANGE 10 SECONDS AGO)	S8030640
1786	2R	0654 8C01	CLSM	"SET LARGEST H BURST NEGATIVE	S8030650
1787	14	0655 8437	FETM	"SET UP A COUNTER TO CYCLE THE	S8030660
1788	22	0656 7032 (0082)	STA	"OS STATIONS	S8030670
1789	26	0657 FC191F7B	CLAM	"SET A AS BASE IN CASE ALL	S8030680
1790	28	0659 9C50	CLAM	"STATIONS ARE OFF OR TOO CLOSE	S8030690
				"	S8030700
1791	8R	065A F52A00D5	CLA	X2,, POWERS_OF_TWO "READ STATIONS SELECTED BY	S8030710
1792	16	065C E40000E5	EXT	0,, STATIONS_IN_USE "THE OPERATOR	S8030720
				"HAS THE OPERATOR	*1030730
1793	20	065E D015 (0664)	BNE	"TURNED THIS STATION OFF?"	*R030740
1794	8R	065F F02800CC	COM	"AT THIS POINT THE STATION IS	S8030750
				"EITHER OFF OR TOO CLOSE	S8030760
				"IS THIS STATION	*1030770
1795	12	0661 D110 (0672)	BNE	"THE PRESENT BASE STATION?	*R030780
1796	8R	0662 7040 (00CD)	STA	"SET THE NEED BASE MARKER TO	S8030790
1797	12	0663 D00E (0672)	BUC	"FORCE A NEW BASE SELECTION NOW	S8030800
1798	8R	0664 8670 (00FD)	FET	"SET UP ARGUMENTS FOR THETA 1	S8030810
1799	14	0665 C003	FET	STA NO	S8030820
				"COMPUTE THE DISTANCE BETWEEN THE	*1030830
1800	22	* 0666 F80D0B62	BSV	"STATION AND THE CRAFT	S8030840
1801	26	0663 F809048A	COMM	0,, F(((400)*6076)/2.09507)/3.14159)	* 030850
1802	36	066A D710	PRN	1	* 030860
				"IS THE STATION	*1030870
1803	40	0668 D032 (066E)	BRG	"MORE THAN 400 N MILES AWAY?	S8030880
1804	2R	066C 8000	SUB	"THIS STATION IS TOO CLOSE	S8030890
1805	6	066D D80F (065F)	BUC		S8030900
1806	6R	066E 8241	COM	"COMPARE THE H BURST FOR THIS	S8030910
				"STATION AGAINST THE LARGEST OF	S8030920
				"THE H BURSTS FROM THE STATIONS	S8030930
				"ALREADY EXAMINED	S8030940
				"IS H BURST MORE	*1030950
1807	10	066F D032 (0672)	BRG	"THAN THE LARGEST H BURST?	*R030960

1808	2R	0670 A452	MOD 36	05/18/76	AN/ERN-7	CLA	5,2	PAGE 90
1809	8	0671 A641	*			CLA	14,1	"THIS STATION IS STRONGER"
1810	2R	0672 9412	\$5			ADD	1,2	"SAVE STATION NUMBER"
1811	10	0673 C52A (065A)	*			8XU	2,1,14	"REPLACE LARGEST H BURST WITH THE STRONGEST"
1812	6R	0674 9E4D (00CD)				CLA	0, NEED_BASE	"H BURST FROM THIS STATION"
1813	10	0675 D06F (0685)				BRE	0, NEED_BASE	"INCREMENT H BURST POINTER"
1814	4R	0676 F0190010				SUBM	0, NEED_BASE	"HAVE ALL"
1815	16	0678 F71A00C8				CLA	1, OS*2	"STATIONS BEEN EXAMINED?"
1816	22	067A F0040CCD				MPYM	0, OS*2	"IS A BASE STATION NEEDED NOW?"
1817	34	067C F71900C8				ADD	0, OS*2	"NOW DETERMINE IF THE STRONGEST"
1818	38	067E F4090000				2ADD	0, OS*2	"STATION IS SUFFICIENTLY STRONGER"
1819	40	0680 8415				ADD	0, OS*2	"THAN THE PRESENT BASE STATION"
1820	42	0681 8415				ADD	0, OS*2	" "
1821	48	0682 8201				COM	0, OS*2	"H = 1.1*(H BURST(BASE)) + H(0)"
1822	52	0683 D041 (0685)	*			BLE	0, OS*2	"IS THE LARGEST"
1823	22R	0684 D550				8BK	0, OS*2	"H BURST GREATER THAN H?"
1824	14R	0685 D730	\$6			PRN	0, OS*2	"EXIT - NO CHANGE IN BASE STATIONS"
1825	2R	0686 A401	\$77			CLA	0, OS*2	"BASE STATION CHANGE"
1826	4	0687 8400				ADD	0, OS*2	"SAVE NEW BASE STATION NO."
1827	16	0688 7C48 (00C8)				PTRD	0, OS*2	" "
1828	24	0689 8411				FETM	0, OS*2	"PHASE DIFFERENCE TRACKING?"
1829	28	068A D0D2 (068D)				BCF	0, OS*2	"SUBMARINE ALWAYS PHASE DIFF"
1830	8R	068B 7000 (0080)	*			STA	0, OS*2	" "
1831	16	068C 7033 (0083)	*			STA	0, OS*2	"SET MARKER TO RESET TRACKING"
1832	10R	068D F01700CD	\$7			STA	0, OS*2	"FILTERS BECAUSE OF BASE CHANGE"
1833	14R	068F D510	\$10			8BK	0, OS*2	"RESET TRACKING FILTER START"
							0, OS*2	"MARKER BECAUSE NEW BASE STATION"
							0, OS*2	"PHASE'S ARE NOT AVAILABLE YET"
							0, OS*2	"THEY WILL BE AVAILABLE IN 10 SECS"
							0, OS*2	"RESET NEED BASE MARKER"
							0, OS*2	"EXIT"

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VELOCITY PROCESSING

* THIS PROGRAM READS AND CONVERTS THE TWO SYNCHRO INPUTS (SHIPS LOG
* AND TRUE HEADING) INTO A USABLE FORM. IT COMPUTES THE VELOCITY
* ALONG THE R2 AND R3 AXIS BASED ON THE NAVIGATION MODE SELECTED BY
* THE OPERATOR. IT IS A NON OMEGA TASK THAT IS EXECUTED EVERY
* TENTH OF A SECOND.

VELOCITY_PROCESSING:

1834	8R	0690	F408001A	0,TRUE_HEADING_INPUT "SET UP INDEX TO READ 3	VP031330
1835	24	C692	8451	5,1 "SYNCHRO INPUTS FROM DMA	*H031340
1836	26	0693	90F7	15,7	*H031350
1837	6R	C694	A746	IX,6 "READ SYNCHRO INPUT"	*H031360
1838	12	C695	5661 (00E1)	0,HX1000 "INCREMENT OCTANT AND EXTRACT	*H031370
1839	20	0696	E420177E	2,0,HX6000 "QUAD FROM BITS 14 AND 15	*H031380
1840	24	0698	4422	2,1 "SCALE QUADRANT AT PI	*H031390
1841	26	0699	A430	3,0 "EXTRACT TAN/COT FROM 1 TO 12	*H031400
1842	34	069A	E403177F	0,3,HX0FFF "RESCALE TO 80 USE AS SINE	*H031410
1843	40	069C	4658 (0008)	0,HX0008 "SET COSINE = 1	*H031420
1844	42	069D	9C10	1,0 "USE ARCTAN TO GET ANGLE AT PI	VP031430
1845	54	069E	86F3 (00F3)	0,DX(7FFFFFFF) "BASE ANGLE NOW BETWEEN 0 AND 4	VP031440
1846	592	069F	1800	0,0 GET BASE ANGLE	HH031450
1847	600	06A0	E43300E1	3,3,HX1000	HH031460
1848	604	06A2	D011 (06A4)	"IS IT A COTAN?"	VP031470
1849	4R	06A3	A800	"(ORIGINAL OCTANT = 1, 3, 5 OR 7)	HH031480
1850	2R	06A4	8402	"COMPLIMENT ANGLE"	VP031490
1851	10	06A5	734F	"NEW BASE BETWEEN 315 AND 360 DEG	VP031500
1852	18 *	06A6	F80D06EE	"ADD QUADRANT TO GET FINAL RESULT	VP031510
1853	26	06A8	C545 (0694)	"SAVE IN R15 STACK	VP031520
				"SMOOTH INPUT WITH OLD DATA TO	VP031530
				"ELIMINATE BIG JUMPS DUE TO NOISE	VP031540
				"HAVE ALL THREE	VP031550
				"SYNCHRO'S BEEN PROCESSED?"	VP031560
				"THE R15 STACK NOW CONTAINS IN R15 AND R15+1,	VP031570
				"TRUE HEADING AND SHIPS SPEED RESPECTIVELY."	VP031580
					VP031590
					VP031600
					VP031610
					VP031620
					VP031630
					VP031640
					VP031650
					VP031660
					VP031670
					VP031680
					VP031690
					VP031700
					VP031710
					VP031720
					VP031730
					VP031740
					VP031750

* THE OPERATOR HAS SELECTED A NAV - HDG
* MODE THROUGH A C-I PANEL PROCEDURE.
* THE PROCEDURE DICTATES THAT ONE AND

SELECTED.

031760

VP031770

031780

VP031790

031800

031810

031820

05031830

VP031840

031850

VP031860

031370

VP031880

WP031890

031900

WP031910

VP031920

WP031930

061031940

MS031950

WP031960

WP031970

WP031980

*2031990

MR032000

0102750dM
WP032010

4H032020
4H032030

WP032030
WP032040

VP032040
#2033050

0507507*
073040

032060
032070

WP032070
WP032080

VP032080
VP032090

WP032090
WP032100

0013204A
011230DA
00032110

032110
032120

WP032120
WP032130

041230140
051330140051209M
041301A

032160

032170

032180

00735011

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				*H032190	
				*H032200	
				*H032210	
				*2032220	
				*H032230	
				*H032240	
				*H032250	
				*H032260	
				*H032270	
				*H032280	
				*H032290	
				*2032300	
				*H032310	
				*H032320	
				*H032330	
				*H032340	
				*H032350	
				*H032360	
				*H032370	
				*H032380	
				*H032390	
				*H032400	
				*H032410	
				*H032420	
				*H032430	
				*H032440	
				*H032450	
				*H032460	
				*H032470	
				*H032480	
				*H032490	
				*H032500	
				*H032510	
				*H032520	
				*H032530	
				*H032540	

IS MONITOR UNIT	MONITOR UNIT	TRUE INDICATING	MONITOR UNIT
"IS MONITOR UNIT			
"OVERIDE BUTTON			
"LAB USE?			
"SET V2=V3=0 IN LAB"			
"SET PSI A = 45 DEG IN LAB"			
"READ PREVIOUS NAV MODE"			
"HEADING_MODE NOT USED IN SUB			
"COMPARE OLD AND NEW NAV MODES			
"IS THE NEW NAV			
"MODE DIFFERENT THAN THE PREVIOUS			
"NAV MODE?"			
"SET KALMAN VEL CORRECTIONS			
"DELTA V2,3 = 0 BECAUSE THE			
"PREVIOUS CORRECTIONS ARE			
"PROBABLY NO LONGER VALID			
"READ DELTA V2,3			
"VC2 = V2 + DELTA V2			
"VC3 = V3 + DELTA V3			
"SAVE VC2,3 AT B12 FT/SEC			
"SAVE V2,3 AT B12 FT/SEC			
"SAVE PSI A = HEADING			
"SAVE HDG/NAV MODES			
"PRUNE 2 EXEC REGISTERS			

IN GENERAL THE REGISTERS CONTAIN THE FOLLOWING	NAV MODE	HDG MODE	PSI A	V3	V2	SPARE	SPARE
R6							
R5							
R4							
R3							
R2							
R1							
R0							

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VP032810

VP032820

#H032830

#H032840

#H032850

#H032860

#H032870

VP032880

VP032890

VP032900

#032910

#S032920

#032930

#1032940

VP032950

VP032960

VP032970

VP032980

VP032990

VP033000

VP033010

VP033020

VP033030

VP033040

* SYNCHRC SMOOTHING ROUTINE

* THIS PROGRAM WILL SMOOTH THE NEW
* SYNCHRC INPUT IF IT IS SUBSTANTIALLY
* DIFFERENT THEN THE OLD VALUE

SMOOTH SUB X4,,SMOOTH_DATA "FORM .02(NEW - OLD) WHICH WILL

MPYM 0,,F(.02) "BE THE INCREMENT OF CHANGE IF

CLA 1,0 "NEW - OLD IS LARGE

BRG \$1 "FORM ABSOLUTE .02(NEW - OLD)

CLS 0,0 "COMPARE DIFF AGAINST 4.4

CONM 0,,F(((4.4)/180)*.02) "DOES NEW - OLD

BRG \$2 "EXCEED 4.4 DEGREES?

CLA IX15,4 "SMALL CHANGE SO USE NEW VALUE

BUC \$3 "WITHOUT ANY SMOOTHING

CLA 0,1 "LARGE CHANGE - SMOOTH NEW VALUE

"SMOOTHED V = .02(NEW-OLD) + OLD

ADD X4,,SMOOTH_DATA "SAVE IN R15 STACK FOR USE NOW

STA IX15,4

STA X4,,SMOOTH_DATA "SAVE IN SMOOTH DATA FOR NEXT

STA 15 "TIME

B8K

06EE F1481F67

06F0 F004028F

06F2 410

06F3 7031 (06F5)

06F4 A000

06F5 F8090010

06F7 D032 (06FA)

06F8 A7F4

06F9 D004 (06FE)

06FA A401

06FB F5481F67

06FD 73F4

06FE F1471F67

C700 D5F0

9R

14

16

20

2R

4R

8

6R

10

2R

10

18

10R

18

1913

1914

1915

1916

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1918

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1926

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VP033050

*H033060

*H033070

*H033080

*H033090

RU033100

RU033110

RU033120

RU033130

RU033140

RU033150

RU033160

RU033170

*S033180

RU033190

RU033200

RU033210

RU033220

RU033230

RU033240

RU033250

RU033260

RU033270

RU033280

RU033290

RU033300

RU033310

11 033320

11 033330

RU033340

RU033350

RU033360

RU033370

RU033380

11 033390

RU033400

RU033410

RU033420

RU033430

RU033440

RU033450

RU033460

*S033470

RIJ UPDATE

* THIS IS A NON OMEGA TASK THAT UPDATES

* CRAFT POSITION 10 TIMES A SECOND

* RIJ_UPDATE FEIM 11,0

* 8,,VC3

* 10,,VC2

* 8,,=DF((.1)/2.09260+78-14) DT/R0 AT 8-14

* 10,,=DF((.1)/2.09260+78-14) DT/R0 AT 8-14

* 6,,R11

* 6,,= - (1 + E(1-2R11**2 + R31**2

* 6,,= - (1 + E(1-2R11**2 + R31**2

* 6,,=DF(1.08-2) " * (ANG 2) + KALMAN CORRECTION 2

* 4,,R21

* 2,,4

* 2,,2

* 0,,R31

* 4,,0

* 0,,0

* 0,,2

* 2,,0

* 2,,6

* 0,,6

* 0,,=DF(1/298.25) E @ B0

* 2,,=DF(1/298.25)

* 0,,=DF(1.08-2)

* 2,,=DF(1.08-2)

* 0,,8

* 2,,10

* 4,,4

* 4,,=DF(1/298.25) E*2R31**R21

* 10,,4

* 8,,4

* 10,,0

* 10,,10

* 8,,2

* 8,,=DELTA_THETA_3 KALMAN CORRECTIONS

* 10,,=DELTA_THETA_2

* 3,,0

* CLEAR KALMAN CORRECTIONS 2,3

0701 8480

0702 F48A008F

0704 F4AA008E

0706 F861AA2

0708 F8A51AA2

070A FC6A1F69

070C 6866

070D 8C66

070E F86800F5

0710 FC4A1F6F

0712 AC24

0713 6822

0714 FC0A1F75

0716 6840

0717 6800

0718 8802

0719 A820

071A 8826

071B 8806

071C F8061AA4

071E F8261AA4

0720 96F5 (00F5)

0721 FC2B00F5

0723 6808

0724 682A

0725 BC44

0726 F8461AA4

0728 68A4

0729 6884

072A 8CA0

072B A8AA

072C 8C82

072D FC8B1F2D

072F FCAB1F2B

0731 8430

28R

36

44

64

84

94

110

114

124

134

138

154

164

180

196

200

204

208

212

232

252

260

270

286

302

306

326

342

358

362

366

370

380

390

402

1927

1928

1929

1930

1931

1932

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1934

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1952

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1954

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1957

1958

1959

1960

1961

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1962	424	0732	F4371F28	3,, DELTA_THETA_2 "	(THEY WILL BE NON ZERO AT MOSTRU0033480
1963	442	0734	0750	PRN	"ONCE PER 10 SECONDS)
1964	448	0735	9E70 (00FD)	CLA	UPDATE THIS SET OF RIJ'S
1965	450	0736	A410	CLA	STORE THEM IN THE SAME PLACE
					RU0033510
					RU0033520
					*I033520
1966	458 *	0737	F800C743	ROTATE_RIJS	"THETA 2, DELTA THETA 3
1967	472	0739	F80C1F6F	0,, R21	"COMPUTE THETA P = ATAN R21/R31
1968	486	0738	F80C1F75	0,, R31	"SAVE THETA P, SIN (THETA P)
1969	1024	0730	180C	0,0	"AND COS (THETA P) FOR OTHER
1970	1034	073E	7840 (00C0)	0,, THETA_P	"PROGRAMS
1971	1468	073F	1400	0,0	AND
1972	1490	0740	F4371F92	3,, COS_THETA_P	FOR OTHER ROUTINES
1973	1504	0742	D510	1	RU0033590
					RU0033600

* THIS PROGRAM WILL ROTATE A SPECIFIED SET OF RIJS. THE CALLING
SEQUENCE IS AS FOLLOWS.

RQ = ADDRESS OF ROTATED RIJ MATRIX

R1 = ADDRESS OF RIJ MATRIX TO BE ROTATED

R2,3 = DELTA THETA 3

R4,5 = DELTA THETA 2

(ALL REGISTERS PRUNED ON RETURN)

* RIJ ROTATE

* THIS PROGRAM WILL ROTATE A 3X3 MATRIX (R)
* THROUGH THE 2 ANGLES SPECIFIED

1974	8R	0743	8412	ROTATE_RIJS	FETD	1,2	"	R21	RU033750
1975	12R	0744	C530	SI	FETD	X3,0	"	R31	RU033760
1976	24	0745	C556		FETD	X5,6	"	R31(D2)	RU033770
1977	36	0746	C57C		MPYD	X7,12	"	R21(D3)	RU033780
1978	52	0747	680C		MPYD	0,12	"	R21(D3)-R31(D2)	RU033790
1979	68	0748	682A		SUBD	2,10	"	R21(D3)-R31(D2)	RU033800
1980	72	0749	8820		CLAD	2,0	"	"GIVEN THE 2 ANGLES T2 AND T3	RU033810
1981	76	074A	AC02		RSAD	0,2	"	"THEN	RU033820
1982	86	0748	F8244000			2,1	"	"	RU033830
							"	"	RU033840
							"	"	RU033850
							"	"	RU033860
							"	"	RU033870
							"	"	RU033880
							"	"	RU033890
1983	90	074D	8C42		ADD	4,2	"	"	033900
1984	94	074E	A824		CLSD	2,4	"	"	033910
1985	110	074F	682A		MPYD	2,10	"	"	033920
1986	126	0750	684C		MPYD	4,12	"	"	033930
1987	138	0751	C82D		FETD	2,13	"	"	033940
1988	154	0752	680C		MPYD	0,0	"	"	033950
1989	170	0753	6822		MPYD	2,2	"	"	033960
1990	174	0754	BC20		ADD	2,0	"	"	033970
1991	184	0755	F8244000		RSAD	2,1	"	"	033980
1992	192	0757	ADD0		CLAD	X13,0	"	"	033990
1993	208	0758	6820		MPYD	2,0	"	"	034000
1994	212	0759	B802		SUBD	0,2	"	"	034010
							"	"	034020
							"	"	034030

R11=R11-R11(Z)+R21D3-R31D2
 R21= R21+X
 R31= R31+Y
 "

0,4
 X12,0
 3
 X7,6
 X6,6
 X5,12
 X4,12
 2,2
 3,2
 0,51
 7

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 ADD
 PTRD
 PRN
 ADD
 PTRD
 ADD
 PTRD
 ADD
 ADDM
 ADDM
 SXU
 BSK

(0744)

075A BC04
 075B 7DC0
 075C 0730
 075D 8D76
 075E 7066
 075F 8D5C
 0760 7D4C
 0761 9422
 0762 9432
 0763 C600
 0764 D570

1995 216
 1996 228
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 2004 294
 2005 26R

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CF034150

*H034160

*H034170

KALMAN FILTER

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* THIS PROGRAM PROCESSES TRACKING FILTER MEASUREMENTS AND POSITION FIXES
* TO GENERATE ESTIMATES OF SYSTEM ERRORS. IT IS AN OMEGA TASK THAT IS
* ENTERED 5 MILLISECONDS BEFORE END BURST. THIS PROGRAM ONLY CYCLES
* WHEN THE STATION COUNTER IS 0 (STATION A). IT HAS BEEN SYNCHRONIZED
* WITH THE NON OMEGA TASK ROUTINES IN SUCH A WAY THAT RIJ UPDATE OCCURS
* 5 MILLISECONDS BEFORE KALMAN. FIVE MILLISECONDS AFTER KALMAN IS INITIATED
* THE END BURST/TRACKING FILTER ROUTINES WILL INTERRUPT KALMAN SO
* THAT ALL TRACKING FILTERS WILL BE TIME UPDATED TO THE END BURST TIME.
* THIS RESULTS IN THE RIJ, KALMAN AND TRACKING FILTER UPDATES OCCURRING
* WITHIN A 10 MILLISECOND PERIOD. FOR THIS TIMING TO BE CORRECT KALMAN
* MUST NOT READ ANY TRACKING FILTER DATA IN THE 5 MILLISECONDS AVAILABLE
* BEFORE THE END BURST INTERRUPT.

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*H034290

*H034300

*H034310

*H034320

CF034330

CF034340

*H034350

*H034360

CF034370

CF034380

CF034390

CF034400

HH034410

CF034420

11 034430

11 034440

11 034450

11 034460

11 034470

11 034480

CF034490

CF034500

CF034510

CF034520

CF034530

CF034540

CF034550

CF034560

CF034570

"SET NEXT OMEGA TASK TO OCCUR IN

0,,END_BURST-OMEGA_TASK_TABLE/2 "5 MILLISECONDS"

0,,STATION_COUNTER

"IS IT"

COVARIANCE_INITIALIZATION "STATION A TIME?"

0

"EXIT"

COVARIANCE_INITIALIZATION:

0

13,,P_MATRIX

0,,2 START PANEL UPDATE AT EVEN SEC

0,,PANEL_COUNT

0,,KAL_STA_FLG HAS PP FINISHED OS STATIONS

\$21

K_EXIT

10,,N

2,,COLD_START_MKR

"IS IT TIME TO INITIALIZE KALMAN?"

8,,0

SAVE_RIJ

"SET NUMBER OF STATE VECTORS (N)"

"TO 0 (FOR 1 STATE VECTOR)"

"RESET NO KICK AND STATION CHECK"

"ZERO THE FIRST STATE VECTOR"

"ZERO THE COVARIANCE MATRIX (P)"

"

"P44 = .25 MICROSEC/SEC"

KALMAN_FILTER;

OMEGA

FET

BRE

BBK

COVARIANCE_INITIALIZATION:

PRN

FETM

CLSM

STA

CLA

BRE

BUC

CLA

CLA

BNE

FETM

2006

2006

2007

70R

78

2008

2009

2010

2010

2011

2012

2013

2014

2015

2016

2017

2018

2019

2020

0765 0807

0766 8635 (0085)

0767 0061 (0769)

0768 0500

0769 0700

076A F4081D17

076C 8C02

076D FC07003E

076F 9E10 (0090)

0770 0062 (0773)

0771 C4000A15

0773 F4AAC084

0775 F42A0067

0777 D11E (0796)

0778 8480

8R

42

44

54

60

64

6R

9R

16

20

22R

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MP33 = (441.176)**2 / 3 MICROSEC
MP22 = INITIAL P22
MP11 = INITIAL P11
"THE INITIAL P11 AND P22 ARE THE
"VALUES FROM KALMAN AT TURN OFF
"IF POSITION AND TIME HAVE NOT
"YET BEEN INSERTED. THEY ARE
"0.5 N MILE IF TIME HAS BEEN
"INSERTED (NOT OLD TIME ACCEPTED)
"AND THERE IS NO POSITION INSERT
"YET. THEY ARE THE INSERTED
"QUALITY IF POSITION HAS BEEN
"INSERTED
ZERO X1,X2,X3,X4
ZERO X5,X6,X7,X8,X9

PTR
4,,XXXX
12,,160
0,0
IX11,13
11,$3
0,,=DF((-25)*.25D-12B+36)
0,,P44
0,,NOISE+2
0,,P33
2,,SAVE_POSITION_VARIANCES
0,,=DF(5*6076/2.05D7/2.05D78-8)
0,,SIGMA_SQ_KICK
"SET KALMAN STARTED MARKER WHICH
0,,P11 " RESETS THE INITIALIZE MARKER
0,,P22 " NOT ZERO
13,,COLD_START_MKR
10,,RIJ "SAVE THE RIJ POSITION MATRIX NOW
10,,B1 "TO ESTABLISH THE CURRENT OMEGA
4,,RIJ+12 "POSITION FOR KALMAN COMPUTATIONS
4,,B1+12
034910
*H034920
*H034930
*H034940
*H034950
*H034960
*H034970
CF034980
CF034990
CF035000

STA 0,,N

PTR
4,,XXXX
12,,160
0,0
IX11,13
11,$3
0,,=DF((-25)*.25D-12B+36)
0,,P44
0,,NOISE+2
0,,P33
2,,SAVE_POSITION_VARIANCES
0,,=DF(5*6076/2.05D7/2.05D78-8)
0,,SIGMA_SQ_KICK
"SET KALMAN STARTED MARKER WHICH
0,,P11 " RESETS THE INITIALIZE MARKER
0,,P22 " NOT ZERO
13,,COLD_START_MKR
10,,RIJ "SAVE THE RIJ POSITION MATRIX NOW
10,,B1 "TO ESTABLISH THE CURRENT OMEGA
4,,RIJ+12 "POSITION FOR KALMAN COMPUTATIONS
4,,B1+12
034910
*H034920
*H034930
*H034940
*H034950
*H034960
*H034970
CF034980
CF034990
CF035000

* COMPUTE THE OFF DIAGONAL AND
* NON-UNITY DIAGONAL ELEMENTS
* OF THE PHI MATRIX AND COMPUTE
* THE R MATRIX
* NOTE - THERE IS SPACE FOR 14
* ITEMS IN PHI MATRIX
COMPUTE_PHI_MATRIX
13,,PHI_MATRIX+4
11,,R_MATRIX+8
10,,NAV_MODE
CLAM
CLA

2021 30 0775 7004 (0084)

2022 52 077A F4371C27
2023 78 077C F4471CE8
2024 82 077E FCC900A0
2025 86 0780 B800
2026 10R 0781 788D
2027 18 0782 CCB2 (0781)
2028 8R 0783 9EF7 (00F7)
2029 20 0784 F8071D53
2030 30 0786 FC0A0C38
2031 42 0788 F8071D3F
2032 22R 078A F82C1F96
2033 36 078C F80C1AA6
2034 14R 078E FC071D00
2035 28 0790 FC071D17
2036 42 0792 FC071D2B
2037 52 0794 F0070087
2038 54R 0796 F8AC1F69
2039 108 0798 FCA71CD5
2040 138 079A F84C1F75
2041 168 079C FC471CE1

2042 4R 079E FCD90060
2043 8 07A0 FC890052
2044 16 07A2 F4AA1F8E

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2045 48 07A4 8400 FETM 13,,0 "SET FIRST 7 ITEMS IN PHI TO ZERO" CF035010
2046 110 07A5 FCC7005C PTRD 12,,PHI_MATRIX CF035020
2047 120 07A7 FCOA1A48 CLAD 0,,=DF(((108-18)*.408D+61*2)/360) CF035030
2048 130 07A9 790C STAD X13,,12 "9TH ITEM = PHI 3,4 CF035040
2049 140 07AA FCOA1AAA CLAD 0,,=DF(((10)/2.095D+78-16) CF035050
2050 150 07AC 7900 STAD X13,,0 "3RD ITEM = PHI 1,8 CF035060
2051 160 07AD 790A STAD X13,,10 "8TH ITEM = PHI 2,9 CF035070
2052 170 07AE FCOA1AAC CLAD 0,,=DF(108-7) DELTA T CF035080
2053 174 07B0 AC60 CLAD 6,0 CF035090
2054 176 07B1 540E ADDM 13,,14 CF035100
2055 196 07B2 F9A60C24 MPYD X10,,BETA_NRA CF035110
2056 206 07B4 79D6 STAD X13,,6 "13TH ITEM = PHI 8,8 CF035120
2057 216 07B5 79D8 STAD X13,,8 "14TH ITEM = PHI 9,9 CF035130
2058 226 07B6 F9AA0C2A CLSD X10,,SIGMA_NRA SIGMA V CF035140
2059 236 07B8 F8047FFF MPYDM 0,,X(7FFF) CF035150
2060 254 07BA 69D6 MPYD X13,,6 BETA CF035160
2061 266 07B8 C031 FET 3,1 HH035170
2062 288 07BC FC270058 PTRD 2,,R_MATRIX+14 R8,R9 HH035180
2063 320 07BE 8400 FETM 13,0 HH035190
2064 382 07BF F4D7004A PTR 13,,R_MATRIX 0 R1-R7 HH035200
2065 8R FETM 55700 CF035210
2066 14 07C1 F4080012 FETM "SET UP POINTERS FOR P MATRIX CF035220
2067 22 * 07C4 F80D08A6 BSV "START P UPDATE" *I035240
2068 28 07C6 8402 FETM "COMPUTE (K) = (P)*(PHI)TRANSPPOSE CF035250
2069 36 07C7 F4080012 FETM "SET UP POINTERS FOR K TRANSPPOSE CF035260
2070 44 * 07C9 F80D08A6 BSV "FINISH P UPDATE" *I035280
2071 52 * 07C8 F80D08D6 BSV "P = (K)TRANSPPOSE *(PHI)TRANSPPOSE CF035290
2072 66 07CD F4380010 FETM "MAKE P SYMMETRIC CF035300
2073 70 07CF FC491017 CLAM 3,,16 "UPDATE P WITH NOISE MATRIX R CF035310
2074 10R 07D1 F02A004A CLAD 4,,P_MATRIX "P(I,I) = P(I,I) + R(I), I = 1, 9 CF035320
2075 18 07D3 8E04 ADDM 10,4 X2,,R_MATRIX * 035330
2076 28 07D4 7A04 STAD 10,4 CF035340
2077 32 07D5 F4490014 ADDM 4,,20 CF035350
2078 40 07D7 CC27 (07D1) BSV 2,,\$1 CF035360
2079 10R 07D8 FCOA1D17 CLAD 0,,P_MATRIX "SAVE UPDATED P11, P22 FOR USE BY \$035380
2080 20 07DA FC2A1D28 CLAD 2,,P_MATRIX+20 "SYSTEM FOR KALMAN INITIALIZATION CF035390
* "IF THERE IS A POWER DROPOUT NOW CF035400
* "AND FOR DISPLAY CF035410
* TIME UPDATE STATE VECTORS (X) 2,,SAVE_POSITION_VARS CF035420
* "HQ35430

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[illegible]

2117	080C	FC271F28	PTRO	2,,DELTA_THETA_2	"STORE DELTA THETA'S FOR RIJ UP-	CF035870
2118	080E	F4181CD5	FETM	1,,81	"DATE TO CORRECT PRESENT POSITION	CF035880
2119	0810	A401	CLA	0,,1		CF035890
2120	0811	F800Q743	BSV	ROTATE_RIJS	"APPLY CORRECTIONS TO POSITION	*1035920
2121	0813	F4381C27	FETM	3,,X	"KALMAN SAVED AT START OF CYCLE	CF035930
2122	0815	A603	CLA	10,,3		* 035940
2123	0816	F00B1C1E	SUB	0,,XXX	"DELETE CORRECTION JUST APPLIED	CF035950
2124	0818	7203	STA	10,,3	"TO POSITION FROM ALL STATE	CF035960
2125	0819	A531	CLA	X3,,1	"VECTORS	CF035970
2126	081A	F00B1C1F	SUB	0,,XXX+1	"X(N)1 = X(N)1 - XXX1	CF035980
2127	081C	7131	STA	X3,,1	"X(N)2 = X(N)2 - XXX2	CF035990
2128	081D	9434	ADDH	3,,4		CF036000
2129	081E	C44A (0815)	BSU	4,,37	"ARE THERE MORE	CF036010
2130	081F	F44A1F8E	CLA	4,,NAV_MODE	"VECTORS TO CORRECT?"	*1036020
2131	0821	F45AC0C2	CLA	5,,PSI_A		CF036030
2132	0823	F47A008F	CLA	7,,PSI_A_SAVE		CF036040
2133	0825	F057C08F	STA	5,,PSI_A_SAVE		CF036050
2134	0827	8075	SUB	7,,5	OLD - NEW	CF036060
2135	0828	9E39 (0089)	CLA	0,,DELTA_V2		CF036070
2136	0829	8811	SUBD	1,,1		CF036080
2137	082A	F8060074	MPYD	0,,PHI_MATR IX+24	DECAY DELTA V2	CF036090
2138	082C	FC081D04	ADD0	0,,RES2	DECAY DELTA V2, DELTA V3	CF036100
2139	082E	F0171D05	STA	1,,RES2+1		CF036110
2140	0830	F41A008A	CLA	1,,DELTA_V3		CF036120
2141	0832	F8160074	MPYD	1,,PHI_MATR IX+24	DECAY DELTA V3	CF036130
2142	0834	FC1B1D02	ADD0	1,,RES3		CF036140
2143	0836	F0271D03	STA	2,,RES3+1		CF036150
2144	0838	9639 (0089)	ADD	0,,DELTA_V2		CF036160
2145	0839	F41B008A	ADD	1,,DELTA_V3		CF036170
2146	083B	F00B1C25	SUB	0,,XXX+7		CF036180
2147	083D	F01B1C26	SUB	1,,XXX+8		CF036190
2148	083F	9840	CGMM	4,,0		CF036200
2149	0840	D016 (0847)	BNE	\$10	"IS THE NAV MODE NO RATE AIDING?"	CF036210
2150	0841	C808	FETO	0,,8		CF036220
2151	0842	F80006E4	BSV	RESOLVE+1	"ROTATE DELTA V2,3 THROUGH HEAD-	* 036240
2152	0844	9F33	CLAM	IX3,,3	"ING CHANGE IN LAST 10 SECONDS	*1036250
2153	0845	A412	CLA	1,,2	V2 AT 2**12 FPS	CF036260
2154	0846	B412	ADD	1,,2	V3 AT 2**12 FPS	* 036270
						* 036280
						* 036290

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2189	12	0878	CD26	(0863)	BXUD	2,, \$56	"CORRECT SYNC TIME"	% 036730	
2190	32R	0879	D7C0		PRN	12	"	%036740	
2191	44	087A	8431		FETM	3,, 1		CF036750	
2192	52	087B	F40A1C21	*	CLA	0,, XXX+3	"FORM INTEGRAL OF T ZERO DOT WITH CF036760		
				*			"RESPECT TO TIME SCALED AT 2.5	CF036770	
				*			"MILLISECONDS SO THAT AN OVERFLOW CF036780		
				*			"WILL OCCUR AT 2.5 MSEC AND EVERY CF036790		
				*			"5 MSEC THEREAFTER.	CF036800	
				*			"SET CLOCK CHANGE TO + 5 MSEC FOR CF036810		
				*			"A SLOW CLOCK	CF036820	
2193	72	087D	F8061AAE		MPVD	0,, =DF((10)/2.58+18D-3)		CF036830	
2194	82	087F	FC08000E		AODD	0,, SUM_T_ZERO_DOT		CF036840	
2195	96	0881	FC07000E		PTRD	0,, SUM_T_ZERO_DOT		CF036850	
				*			"IS IT TIME TO	*2036860	
2196	100	0883	DQ73	(0887)	BND	\$20	"MAKE A CORRECTION TO THE "	*R036870	
				*			"COMPUTER CLOCK?	CF036880	
2197	4R	0884	DQ51	(0886)	BRL	\$21	"IS THE COMPUTER CLOCK TO SLOW?	CF036890	
2198	4R	0885	A800		CLSD	0,0	"CHANGE CORRECTION TO MINUS	CF036900	
				*			"5 MILLISECONDS"	CF036910	
2199	10R	0886	7828	(0048)	STAD	0,, TIME_INC	"SAVE CLOCK CHANGE FOR APPLICA-	CF036920	
				*			"TION TO TIME IN END SLOT ROUTINE CF036930		
2200	22R	0887	0770	\$20	PRN	7	"ADJUST R15 STACK"	CF036940	

**
 * SELECT MEASUREMENT TYPE - TAKE
 * POSITION FIX IF AVAILABLE
 * OTHERWISE TRY FOR A TRACKING
 * FILTER MEASUREMENT
 SELECT_MEASUREMENT;
 FLG

BT+B+EOR

"SET PROGRAM FLAG B FALSE TO NOTECF037010
 "THAT SYSTEM HAS NOT JUST KICKED
 "OPEN ON A POSITION FIXPOINT

"SET M3,4,5,6,7,8,9 = 0
 " (M MATRIX)

"SET E3,4,5,6,7,8,9 = 0
 " (DIVERGENCE CONTROL)

"ZERO M3,4,5,6,7,8,9

12,M_MATRIX+4
 13,0

12,DIVERGENCE_CONTROL+4 ZERO E3,4,5,6,7,8,9

0,PC_INSERT
 NE+A+UCD

"SET PROGRAM FLAG A TRUE FOR A
 "POSITION FIX AND FALSE FOR A
 "TRACKING FILTER MEASUREMENT
 "IS THIS A

TRACKING_FILTER_MEASUREMENT "POSITION FIX?"
 36600

"RESET PROGRAM FLAG C WHICH IS
 "USED TO COUNT THE 2 MEASUREMENTS
 "(NORTH AND EAST ERRORS) CF037210

"SET UP SETS OF ARGUMENTS FOR TWO CF037220
 "MEASUREMENTS CF037230

"FIRST = ERROR EAST, COS THETA P, CF037240
 " - SIN THETA P CF037250

"SECOND = ERROR NORTH, SIN THETA
 " P, COS THETA P CF037270

"SET MEASUREMENT = ERROR
 "SET M1 = 2ND ARGUMENT CF037280

"M2 = 3RD ARGUMENT
 " 2**6 CF037290

"SET MEASUREMENT VARIANCE
 " = INSERTED POSITION QUALITY CF037300

"SET E1 = E2 = POSITION QUALITY
 " MEASUREMENT VARIANCE CF037310

0, MEASUREMENT_VARIANCE CF037320

2, DIVERGENCE_CONTROL E 1,2 2**8 CF037330

CF+C+UCD "CHANGE STATE OF FLAG C - GOES CF037340

2201 2R 0888 DEAD

2202 3R 0889 8400

2203 94 088A FCC7004E

2204 126 088C 8400

2205 188 088D FCC70060

2206 194 088F 9E26 (00A6)

2207 196 0890 DE10

2208 200 0891 D263 (0895)

2209 2R 0892 DECE

2210 32 0893 F84C1C01

2211 54 0895 F82C1F92

2212 62 0897 C807

2213 66 0898 AC84

2214 70 0899 ACA2

2215 74 089A A844

2216 14R 089B FC070074

2217 36 089D FC27004A

2218 48 089F 8681 (0081)

2219 56 08A0 C801

2220 68 08A1 F3070072

2221 90 08A3 FC27005C

2222 92 08A5 DED2

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2223	100 *	08A6 F8000A1E	BSV	COMPUTE_BI_AND_C	"TRUE IF 1ST MEAS OTHERWISE FALSE"	CF037380
2224	108 *	08A8 F8000A64	BSV	MEASUREMENT_UPDATE_X	"START MEASUREMENT PROCESSING"	CF037390
				MEASUREMENT_UPDATE_X	"COMPLETE MEASUREMENT"	CF037400
				MEASUREMENT_UPDATE_X ROUTINE		CF037410
				* RETURNS HERE ONLY IF A STATE		CF037420
				* VECTOR WAS UPDATED.		CF037430
				* IF THE MEASUREMENT RESULTED		CF037440
				* IN NO STATE VECTORS THEN THE		CF037450
				* RETURN SKIPS ONE BOX IN THE		CF037460
				* PROGRAM FLOW.		CF037470
					"MEASUREMENT PROCESSED"	CF037480
2225	114	08AA Q40008B0	2BUC	\$2	"SUCCESSFULLY"	CF037490
2226	2R	08AC DE01	FLG	UC+B+UCD	"MEASUREMENT UNSUCCESSFUL"	CF037500
					"THE POSITION VARIANCES HAVE BEEN"	CF037510
					"KICKED OPEN."	CF037520
					"SET FLAG 8 TRUE TO BYPASS THE 36"	CF037530
					"MILE LIMIT ON STATE VECTOR POSI-	CF037540
					"TION ERRORS."	CF037550
					"IS THIS THE"	CF037560
2227	6	08AD D9DC	BCF	POSITION_MEASUREMENT	"SECOND MEASUREMENT?"	CF037570
2228	18R	08AE D750	PRN	5	"DELETE THE ARGUMENTS FOR THE"	CF037580
					"2ND MEASUREMENT AND TRY THE"	CF037590
					"1ST MEASUREMENT AGAIN"	CF037600
2229	22	08AF D90E	BUC	POSITION_MEASUREMENT	"IS THERE ONE"	CF037610
2230	4R	08B0 D9C6	BGT	\$1	"MORE MEASUREMENT TO PROCESS?"	CF037620
2231	30R	08B1 84C0	FETM	12,0	"RESET THE POSITION FIX MARKER"	CF037630
					"	CF037640
2232	38	08B2 7026	STA	0, PC_INSERT		CF037650
2233	44	08B3 04000A15	BUC	K_EXIT		CF037660
						CF037670

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**
* LOOK FOR MEASUREMENT FROM 1 OR
* MORE FILTERS FOR ANY STATION
  TRACKING_FILTER_MEASUREMENT;
    FETM
      1,,JS-1
        23300
          "SET UP COUNTER TO CONTROL SEARCH CF037720
          "FOR MEASUREMENTS STARTING WITH
          "STATION USED LAST
            23300
              0,,STATION_NUMBER
                6,,2
                6,,DF_MKR
                "SET DIFFERENCE FREQUENCY MARKER
                "
                "INCREMENT STATION COUNTER
                "RESET TO A IF E
                "COMPUTE X = (I ZERO)*(N MILE/CY) CF037810
                "
                0,,=DF(72*6076*6076/2.095D146-8)
                "PHASE DIFFERENCE?"
                "SET X = 0
                "COMPUTE Y = P11 + X
                "DID Y OVERFLOW?"
                "DIFFERENCE FREQ REQUIRED
                "COMPUTE Z = P22 + Y
                "DID Z OVERFLOW?"
                "DIFFERENCE FREQ REQUIRED
                0,,=DF(4*6076*4*6076/2.095D+7/2.095D+78-8)
                "CHECK SIZE OF Z
                "IS Z GREATER THAN 4 N MILE?
                "ERROR'S ARE SMALL"
                "RESET DIFF FREQ MARKER"
                "NUMBER OF FREQ NEEDED FOR MEAS
                " = 2 IF DIFF FREQ OTHERWISE = 1
                CF037930
                CF037940
                CF037950
                CF037960
                CF037970
                CF037980
                CF037990
                CF038000
                CF038010
                CF038020
                CF038030
                CF038040
                CF038050
                CF038060
                CF038070
                CF038080
                CF038090
                *2038100
                "IS THERE A

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2264	20	Q8D0	D051	(08DF)	MOD 36	05/18/76	AN/BRN-7	BRL	\$2	"MEASUREMENT AVAILABLE FROM THIS "FILTER? (N = 3)	CF038110
2265	2R	Q8DE	9041		*			SUBM	4,,1	"DECREMENT NO. OF FREQ STILL "NEEDED FOR A MEAS BY 1	CF038120
2266	8R	Q8DF	C458	(08D5)	\$2			BXU	5,,13	"ARE THERE MORE FREQUENCIES?	CF038130
2267	2R	Q8E0	9840		*			COMM	4,,0	"ARE THERE ENOUGH "FREQ'S AVAILABLE FROM THIS "STATION?"	CF038140
2268	6	Q8E1	D033	(08E5)	*			BRG	\$28	"ARE THERE ENOUGH "FREQ'S AVAILABLE FROM THIS "STATION?"	CF038150
2269	8R	Q8E2	861F	(009F)	*			FET	0,,C,I_STATUS_IMAGE	"SIGNAL LOSS OFF	CF038160
2270	16	Q8E3	D70Q	(08EC)	\$28			PRN	0	"ACCEPT MEASUREMENT IF YES	CF038170
2271	20	Q8E4	D067	(08EC)	\$28			BRE	\$4	"NO MEASUREMENT FROM THIS STATION	CF038180
2272	2R	Q8E5	9C4Q		\$28			CLAM	4,,0	"NO MEASUREMENT FROM THIS STATION	CF038190
2273	10	Q8E6	FC7800H6		\$28			COM	7,,STATION_NUMBER	"HAVE ALL STATIONS BEEN EXAMINED?	CF038200
2274	14	Q8E8	DA1F	(08BA)	\$66			BNE	\$13	"HAVE ALL STATIONS BEEN EXAMINED?	CF038210
2275	12R	Q8E9	843Q		\$66			FETM	3,,0	"NO MEASUREMENTS THIS TIME	CF038220
2276	18	Q8EA	04000A15		\$66			BUC	3,,0	"NO MEASUREMENTS THIS TIME	CF038230
2277	12R	Q8EC	C828		\$4			FETD	2,,8	"MAKE REG AVAIL REP. STAT NO	CF038240
2278	22	Q8ED	FC2700B6		\$4			STA	2,,8	"MAKE REG AVAIL REP. STAT NO	CF038250
2279	32	Q8EF	FF89006F		*			CLAM	IX8,,DF_MKR	"SAVE NUMBER OF THIS STATION ADDRESS-DR MKR + NO OF FREQ	CF038260
2280	34	Q8F1	9801		*			COMM	0,,1	"SAVE NUMBER OF THIS STATION ADDRESS-DR MKR + NO OF FREQ	CF038270
2281	38	Q8F2	D01F	(0902)	*			BNE	\$71	"ARE THERE 3 FREQ "AVAILABLE AND IS DIFF FREQ "MARKER TRUE?"	CF038280
2282	8R	Q8F3	F52A1D07		*			CLA	X2,,DF_COUNTER	"THERE IS AN EXTRA FREQ AVAILABLE "READ COUNTER FOR THIS STATION	CF038290
2283	10	Q8F5	9001		*			SUBM	0,,1	"THAT DEFINES OPTIMUM FREQ PAIR	CF038300
2284	14	Q8F6	F809FFFD		*			COMM	0,,I(-3)	"THE COUNTER CYCLES BETWEEN 11-10 "11-13 AND 13-10. IT IS RESET TO "11-10 WHEN NOT IN DIFF FREQ	CF038310
2285	18	Q8F8	D011	(08FA)	\$70			BNE	\$70	"SET THE N COUNTER OF THE FREQ "THAT IS NOT TO BE USED TO ZERO	CF038320
2286	2R	Q8F9	9C0Q		\$70			CLAM	0,,0	"DF CNT = 0 GOES TO -1 ZERO 13 "DF CNT = -1 GOES TO -2 ZERO 10 "DF CNT = -2 GOES TO 0 ZERO 11	CF038330
2287	10R	Q8FA	F1271D07		\$70			STA	X2,,DF_COUNTER	"THAT IS NOT TO BE USED TO ZERO	CF038340
2288	12	Q8FC	9402		\$70			ADDM	0,,2	"DF CNT = 0 GOES TO -1 ZERO 13 "DF CNT = -1 GOES TO -2 ZERO 10 "DF CNT = -2 GOES TO 0 ZERO 11	CF038350
2289	14	Q8FD	8407		\$70			ADD	0,,7	"RO = 1, 0, 2 FOR 13, 10, 11	CF038360
2290	20	Q8FE	A610		\$70			CLA	11,0	"RO = 1, 0, 2 FOR 13, 10, 11	CF038370

2291	28	09FF E41101CE	MOD 36	05/18/76	AN/BRN-7	EXT	1,1,HXFF00	PAGE 111
2292	36	0901 7210				STA	11,0	CF038540
2293	2R	0902 8466	\$71			ADD	6,6	CF038550
			*					CF038560
			*					CF038570
2294	6	0903 F0F90022	*			SUBM	15,34	CF038580
								CF038590
								CF038600
2295	8	0905 9C80				CLAM	8,0	CF038610
2296	10R	0906 FD6A1EA3	\$7			CLAD	X6,,PHI_ESTIMATE "READ AND SAVE DATA FOR THIS FREQ	CF038620
2297	20	0908 788F				STAD	IX8,15	CF038630
2298	2R	0909 9482	\$20			ADDM	8,,2	CF038640
2299	12	090A FD6A1E33				CLAD	X6,,SIGMA_SQ_PHI_PHI	CF038650
2300	22	090C F8040020				RSAD	Q,,10	CF038660
2301	32	090E 788F				STAD	IX8,15	CF038670
2302	34	090F 9482				ADDM	8,,2	CF038680
2303	40	0910 A607				CLA	IO,7	CF038690
2304	48	0911 E40010F				EXT	Q,0,HX00FF	CF038700
2305	50	0913 A416				CLA	1,6	CF038710
2306	60	0914 788F				STAD	IX8,15	CF038720
2307	70	0915 FD6A1003				CLAD	X6,,SIGMA_SQ_PHI_DOT_PHI_DOT	CF038730
2308	80	0917 F8081AB4				COMD	0,,=DF(.031* .031D-4*2*3.1415926*3.1415926)	CF038740
			*					*2038750
2309	84	0919 D033 (0910)				BRG	\$41	*2038760
			*					CF038770
2310	6R	091A A78F				CLA	IX8,15	CF038780
2311	12	091B 9664 (00E4)				ADD	0,,HX8000	CF038790
2312	20	091C 738F				STA	IX8,15	CF038800
2313	2R	091D 9482	\$41			ADDM	8,,2	CF038810
2314	4	091E 9471				ADDM	7,,1	CF038820
2315	6	091F 9462				ADDM	6,,2	CF038830
2316	14	0920 C598 (0906)				BUX	9,,57	CF038840
2317	2R	0921 A47F				CLA	7,15	CF038850
2318	6	0922 8C59				ADDD	9,9	CF038860
2319	8	0923 B48F				ADD	8,15	CF038870
2320	10	0924 8C01				CLSM	13,,1	CF038880
2321	12	0925 A44B				CLA	4,,11	CF038890
2322	16	0926 D003 (092A)				BUX	\$42	CF038900
2323	2R	0927 9488	\$43			ADDM	8,,8	CF038910
2324	10	0928 F44A00CC				CLA	4,,BASE+1	CF038920
2325	4R	092A FC591CD5	\$42			CLAM	5,,81	CF038930
2326	12	092C C015				FET	1,5	CF038940
2327	16	092D 44C6				MPIM	0,,6	CF038950
2328	22	092E 967E (00FE)				ADD	0,,SV_ADD	CF038960

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MOD	36	05/18/76	AN/ARN-7	FET	0,10	"COMPUTE AND SAVE R . S1, R . S2 "AND R . S3 FOR M MATRIX"	CF038970
2329	28	092F	C00A				CF038970
2330	36 *	0930	F80D1707				#I038980
2331	44	0932	C015				CF038990
2332	52 *	0933	F80D0362				#I039010
2333	62	0935	79A0				CF039020
2334	70 *	0936	F80D1656				#I039030
2335	82	0938	70A6				CF039040
2336	84	0939	94D1				#I039050
2337	88	093A	D564 (0927)				#I039060
2338	2R	093B	5088				#I039070
2339	10	093C	AD80				#I039080
2340	14	093D	F8090444				#I039090
2341	18	093F	D029 (0945)				039100
2342	4R	0940	F4F90022				039110
2343	8	0942	4483				#I039120
2344	14	0943	F0B91088				#I039130
2345	24	0945	8420				CF039140
2346	40	0946	7623				HM039150
2347	46	0947	C4000A15				CF039160
2348	4R	0949	F8095555				CF039170
2349	8	094B	D82C (0940)				CF039180
2350	2R	094C	A458				CF039190
2351	8	094D	4C43				CF039200
							CF039210
							039220
							039230
							CF039240
							CF039250
							CF039260
							CF039270
							CF039280
							CF039290
							CF039300
							CF039310
							CF039320
							CF039330
							CF039340
							CF039350
							CF039360
							#H039370
							CF039380
							CF039390

"COMPUTE AND SAVE R . S1, R . S2
 "AND R . S3 FOR M MATRIX"
 "COMPUTE"
 "PREDICTED CENTRAL ANGLE"
 "SIN THETA 1"
 "HAS THE BASE
 "DATA BEEN COMPUTED YET?"
 GET ANGLE BACK
 NEAR LIMIT
 "IS THE STATION TOO CLOSE?"
 "(360 N MILE)"
 STATION TOO CLOSE OR TOO FAR
 "SET N COUNTER AND NUMBER OF
 "KALMAN DUMPS = 0 FOR ALL 3 FREQ
 MAX RANGE = 120 DEGRESS
 STA NUMBER BASE IN R1
 "COMPUTE POINTERS FOR STATION AND CF039250
 "BASE PROPAGATION DATA
 REG D = 0001
 REG 9 = FREQ COUNTER (D)
 REG 8 = POINTER TO R15 STACK THETA1, R.S2, R.S3, SIN THETA1
 REG 7 = POINTER TO R15 STACK PHI EST, SS, N CNT, IF POINTER
 REG 5 = STA * 3 + FREQ(S) FOR PROP
 REG 4 = BASE * 3 + FREQ(S) FOR PROP
 * START MEASUREMENT LOOP
 CLAM
 * SET PROGRAM FLAG D TRUE IF THIS
 "FREQ QUALIFIES AS A GOOD MEAS

[illegible]

2390	8R	MOD 36	05/18/76	AN/BRN-7	CLA	X5,,PROP_C	READ PROPAGATION VARIANCE	PAGE 114
2391	12	*		SCF	\$49	"FOR STATION	CF039830	
2392	8R			ADD	X4,,PROP_C	"PHASE DIFFERENCE?"	CF039840	
2393	10R	*		RSAD	0,,9	"ADD PROPAGATION VARIANCE FOR	CF039850	
2394	8R	*		ADD	X7,,2	"BASE STATION	CF039860	
2395	20			STAD	0,, MEASUREMENT	"MEASUREMENT VARIANCE = PROPAGA-	CF039870	
2396	24			BCF	\$50	" TION VARIANCE + SIGMA SQ PHI	CF039880	
2397	2R	*		CCM	4,5	"	CF039890	
2398	6			BNE	\$50	"	* 039900	
2399	14R			FETD	X9,,M_4_TABLE	"PHI	CF039910	
2400	26	*		PTRD	X8,,6	"PHASE DIFFERENCE?"	CF039920	
						"IS THIS A	* 039930	
						"BASE STATION MEASUREMENT?	* 039940	
						"READ M4 FROM A TABLE	* 039950	
						"NOTE - M1, M2 WILL BE ZERO	* 039960	
						"	CF039970	
						"USE PHI DOT DR FROM THE TRACKING	CF039980	
						"FILTER AS THE 'PREDICTED'	CF039990	
						"MEASUREMENT REFERENCE	CF040000	
2401	34			CLA	0,, PHI_DOT_DR_BASE		CF040010	
2402	44			MPYDM	0,, F(((101)/4)/3.14159B10) SCALE CYC/SEC 810		CF040020	
2403	64			MPYD	X9,,T*_LAMBDA_CONSTANT_TABLE CONVERT FROM		CF040030	
					13.6 TO APPROPRIATE FREQ		CF040040	
2404	68			BUC	\$51		CF040050	
2405	8R			CLAD	X8,,0	"GET STATION NO., FREQ AND	CF040060	
2406	14	\$50		FET	0,9	"THETA 1 ARGUMENTS FOR THETA C	CF040070	
2407	22			FET	0,, STATION_NUMBER	"	CF040080	
						"COMPUTE PREDICTED TOTAL PHASE	CF040090	
2408	30	*		BSV	THETA_C	"FOR THE STATION	CF040100	
2409	34			BCF	\$51	"PHASE DIFFERENCE?	* 1040110	
2410	12R			FETD	X8,,8	"GET BASE STATION NO., FREQ AND	CF040120	
2411	18			FET	0,11	"THETA 1 ARGUMENTS FOR THETA C	* 040130	
2412	26			FET	0,, BASE+1	"	CF040140	
						"COMPUTE PREDICTED TOTAL PHASE	CF040150	
2413	34	*		BSV	THETA_C	"FOR THE BASE STATION	CF040160	
2414	38			SUBD	2,0	"FORM PREDICTED PHASE DIFFERENCE	* 1040170	
2415	48			PRN	1	"	CF040180	
2416	12R			FETD	X7,,0	"COMPUTE KALMAN MEASUREMENT	CF040190	
2417	16	\$51		SUBD	0,2	"= TRACKING FILTER PHI -	CF040200	
2418	24			MPID	0,, HK0020	" PREDICTED	CF040210	
2419	38			PTRD	0,, MEASUREMENT	"	CF040220	
2420	54			MPYD	11,11	"COMPUTE DIVERGENCE CONTROL E1,2	CF040230	
						"	CF040240	
						"	CF040250	

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2421	64	09A3	FC0A0072	CLAD	0,, MEASUREMENT_VARIANCE	CF040260
2422	190	09A5	DC08	MPVD	0,, 11	CF040270
2423	210	09A6	F8061A86	FETD	0,, =DF(.0625)	CF040280
2424	222	09A8	C821	PTRD	2,, 1	CF040290
2425	244	09A9	FC27005C	RSAD	2,, DIVERGENCE_CONTROL E1,2 2**=8	CF040300
2426	254	09A8	F804C080	FETD	0,, 8	CF040310
2427	270	09AD	C841	PTRD	4,, 1	CF040320
2428	300	09AE	FC470064	CLAD	4,, DIVERGENCE_CONTROL+8 E 5,6,7 2**0	CF040330
2429	310	09B0	FCBA0072	MPVD	11,, MEASUREMENT_VARIANCE	CF040340
2430	320	09B2	FD9A1722	CLAD	X9,, V_LAMBDA	CF040350
2431	336	09B4	6800	MPVD	0,, 0	CF040360
2432	462	09B5	DC80	DIVD	11,, 0	CF040370
2433	482	09B6	F8861A86	MPVD	11,, =DF(.0625)	CF040380
2434	494	09B8	F8B70050	STAD	11,, DIVERGENCE_CONTROL+4 E3 2**=18	CF040390
2435	502	09BA	F40A006F	CLA	0,, OF_MKR	CF040400
2436	506	09BC	D163 (09D0)	BRE	"IS KALMAN IN DIFFERENCE FREQ?	CF040410
2437	6R	09BD	04030A08	BRG	"IS THIS THE 1ST FREQ?"	CF040420
2438	2R	09BF	9CC6	CLAM	"SECOND FREQ"	CF040430
					"FORM DIFFERENCES"	CF040440
2439	4	09C0	9C80	CLAM	11,, 0	CF040450
2440	10R	09C1	FD8A1C06	CLAD	X11,, KAL_TEMP	CF040460
2441	18	09C3	3886	SUBD	IX11,6	CF040470
2442	28	09C4	7886	STAD	IX11,6	CF040480
					"M = M(2ND) - M(1ST), M1,2,3,4	CF040490
					"KICK LIMIT = (2ND) - (1ST)	CF040500
					"MEAS VAR = (2ND) + (1ST)	CF040510
					"MEASUREMENT = (2ND) - (1ST)	CF040520
2443	36	09C5	CC85 (09C1)	BXUD	11,, \$94	CF040530
2444	26R	09C6	F83C1C13	FETD	3,, KAL_TEMP+13	CF040540
2445	32	09C8	9243 (00C3)	SUB	0,, CONNIE_LIMIT	CF040550
2446	40	09C9	7443 (00C3)	PTR	0,, CONNIE_LIMIT	CF040560
2447	50	09CA	FC080072	ADD	0,, MEASUREMENT_VARIANCE	CF040570
2448	60	09CC	F8280074	SUBD	2,, MEASUREMENT	CF040580
2449	82	09CE	FC270072	PTRD	2,, MEASUREMENT_VARIANCE	CF040590
2450	8R	09D0	F80D0A1E	BSV	COMPUTE_BI_AND_C "START MEASUREMENT PROCESSING"	CF040600
2451	16	09D2	F80D0A64	BSV	MEASUREMENT_UPDATE_X "COMPLETE MEASUREMENT"	CF040610
					"MEASUREMENT_UPDATE_X"	CF040620
					"START MEASUREMENT PROCESSING"	CF040630
					"COMPLETE MEASUREMENT"	CF040640
					"START MEASUREMENT PROCESSING"	CF040650
					"COMPLETE MEASUREMENT"	CF040660
2452	6R	09D4	A575	CLA	"READ POINTER TO TRACKING FILTER	CF040670
2453	8	09D5	A460	CLA	"DATA FOR THIS FREQ TO PREPARE	CF040680

* MEASUREMENT_UPDATE_X ROUTINE
 * RETURNS HERE ONLY IF A STATE
 * VECTOR WAS UPDATED.
 * IF NO STATE VECTORS WERE GEN-
 * ERATED THEN IT RETURNS TO \$10
 * IF 'GOOD MEASUREMENT' IS FALSE
 * TO TRY ANOTHER FREQ. OTHERWISE
 \$77
 CLA X7,5
 CLA 6,0

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2454	12	0906 D0D2 (0909)	BCF	\$64	"FOR THE RESET OF FILTERS."	CF040690
2455	2R	0907 8045	COM	4,5	"PHASE DIFFERENCE?"	CF040700
2456	6	0908 D06A (09E3)	BRE	\$65	"IS THIS THE BASE	* 040710
2457	4R	0909 8800	SUBD	0,0	"STATION? (NEVER RESET BASE	* 2040720
					"FILTER)"	CF040730
					"RESET TRACKING FILTER"	CF040740
					"	CF040750
					"OPEN ALL TRACKING FILTER	CF040760
					"VARIANCES	CF040770
					"X6,,SIGMA_SQ_PHI_PHI_DOT	CF040780
2458	16	090A F9671E03	STAD	X6,,SIGMA_SQ_PHI_PHI_DOT	CF040790	
2459	24	090C 9EE9 (00E9)	CLAD	0,,=DF((1)/12)	CF040800	
2460	36	090D F9671E33	STAD	X6,,SIGMA_SQ_PHI_PHI	CF040810	
2461	46	090F F00A1A8E	CLAD	0,,=DF(.177650-3) *006 PI **2	CF040820	
2462	58	09E1 F9671DD3	STAD	X6,,SIGMA_SQ_PHI_DOT_PHI_DOT	CF040830	
2463	8R	09E3 F00A006F	CLS	0,,DF_MKR	CF040840	
				\$65	"COMPLIMENT DIFFERENCE FREQ MKR	CF040850
				*	"(= 0 IF NOT DIFF FREQ)	CF040860
2464	12	09E5 D064 (09EA)	BRE	\$97	"IS KALMAN IN DIFFERENCE FREQ?	CF040870
2465	4R	09E6 D051 (09E8)	BRL	\$96	"IS THIS THE FIRST FREQ?"	CF040880
2466	2R	09E7 9C00	CLAM	0,,0	"RESET DIFF FREQ MKR	CF040890
2467	10R	09E8 F007006F	STA	0,,DF_MKR	"SAVE NEW DIFF FREQ MKR	CF040900
2468	6R	09EA F0654000	RSL	6,,1	"UPDATE KALMAN DUMP COUNTS FOR	CF040910
				\$96	"THIS STATION FREQUENCY	CF040920
				\$97	"RESET COUNT TO 0 AT 100 FOR THE	CF040930
				*	"CONVENIENCE OF THE C/I PROGRAM	CF040940
2469	14	09EC F56A1D88	CLA	X6,,SIGMA_SQ_N_COUNTER	CF040950	
2470	24	09EE F0071D89	STA	0,,N_CTR_SAVE SAVE INCASE OF MISFIRE IN DF	11 040960	
2471	34	09F0 F0671D8A	STA	6,,N_CTR_SAVE+1 R6 IS NCTR INDEX	11 040970	
2472	42	09F2 E400010E	EXT	0,,0,HXFF00	CF040980	
2473	48	09F4 9650 (00DD)	ADD	0,,HX0100	CF040990	
2474	52	09F5 F8096400	COMM	0,,X(6400)	* 041000	
2475	56	09F7 D051 (09F9)	BRL	\$37	CF041010	
2476	2R	09F8 9C00	CLAM	0,0	* 041020	
2477	10R	09F9 F1671D88	STA	X6,,SIGMA_SQ_N_COUNTER	*H041030	
				\$37	*H041040	
				*	*H041050	
				*	*H041060	
				*	*H041070	
				\$10	"INCREMENT POINTERS TO PREPARE	
2478	2R	09F8 9C01	CLAM	13,,1	"FOR THE NEXT FREQ	
2479	4	09FC 9476	ADDM	7,,6	INC T.F. ADDR	
2480	6	09FD 9451	ADDM	5,,1	STA	

2481	8	09FE 9441	MOD 36	05/18/76	AM 38N-7	4,1	BASE	PAGE 117
2482	18	09FF FC9C094E	*				"ARE THERE MORE "FREQUENCIES TO TRY?"	CF041120 *1041130 CF041140 *H041150 *H041160 *H041170 *H041180 *H041190 *H041200
2483	8R	0A01 F40A006F					RESTORE LOW FREQ NCTR IF	11 041210
2484	12	0A03 D024 (0A08)					KICKED IN DIFF FREQ, I.E. DF	11 041220
2485	10R	0A04 FC0A1089					IS NEGATIVE	11 041230
2486	20	0A06 F1171088					0, N_CTR_SAVE	11 041240
2487	4R	0A08 F4F90022	\$101				X1, SIGMA_SQ_N_COUNTER	11 041250
2488	8	0A0A D00A (0A15)					"RELEASE SCRATCH STORAGE	CF041260
2489	36R	0A0B CA66	\$91				K_EXIT	CF041270
2490	74	0A0C FC671C06					M MATRIX	CF041280
2491	96	0A0E F82C0072	*				"SAVE M1,2,3,4, MEAS, MEAS VAR	CF041290
2492	104	0A10 8643 (00C3)					"AND KICK LIMIT FOR THE 1ST FREQ	CF041300
2493	130	0A11 FC371C13					C AND Y	CF041310
2494	136	0A13 040000D4					VARIANCE	CF041320
2495	6R	0A15 9E34 (00B4)					"MEASUREMENT LIMIT	CF041330
2496	8	0A16 9C17					0, KAL_TEMP	*H041340
2497	18	0A17 F40C0A1A					2, MEASUREMENT_LIMIT	*H041350
2498	8R	0A19 7C10 (0090)					0, CONNIE_LIMIT	*H041360
2499	8R	0A1A 7C34 (00B4)	\$30				3, KAL_TEMP+13	"INCREMENT A COUNTER TO CYCLE ALL
2500	16 *	0A1B F80D0C49	*				\$77	"STATIONS THROUGH PROP PREDICTION
2501	54	0A1D 0500					"(ONE EVERY 10 SECONDS)	CF041370 CF041380 CF041390 * 041400 11 041410 * 041420 *1041430 CF041440 CF041450

[illegible]

MOD 36		05/18/76		AN/BRN-7		PAGE 11
2523	4R	QA37	8824	COMD	2,4	% 041890
2524	8	QA38	D05E (0A47)	BRL	\$3	% 041900
2525	4R	QA39	D037 (0A41)	BRG	\$4	% 041910
2526	2R	QA3A	9800	CCMM	0,0	CF041920
2527	6	QA3B	D032 (0A3E)	BRL	\$5	% 041930
2528	8R	QA3C	9EF3 (00F3)	CLAD	0,,=DX(7FFFFF)	CF041940
2529	12	QA3D	D00A (0A48)	BUG	\$1	% 041950
2530	10R	QA3E	FC0A1AB8	CLAD	0,,=DX(80000001)	% 041960
2531	14	QA40	D007 (0A48)	BUG	\$1	% 041970
2532	4R	QA41	AC24	CLAD	2,4	% 041980
2533	130	QA42	DC20	DIVD	2,0	CF041990
2534	134	QA43	F4990040	ADDM	9,,X(40)	CF042000
2535	138	QA45	AC02	CLAD	0,2	CF042010
2536	142	QA46	DC01 (0A48)	BUG	\$1	% 042020
2537	126R	QA47	DC04	DIVD	0,4	% 042030
2538	12R	QA48	F5771CD5	STAD	X7,,B1	% 042040
2539	14	QA4A	B499	ADD	9,9	CF042050
2540	22	QA4B	CD70 (0A2F)	BXUD	7,,COMPUTE_B1	% 042060
2541	10R	QA4C	FQ97ICE7	STA	9,,B1+18	CF042070
2542	20	QA4E	F8481ABA	COMD	4,,=DF((1)/10)	CF042080
2543	24	QA50	D052 (0A53)	BRL	\$6	%042090
2544	10R	QA51	FC4A1ABA	CLAD	4,,=DF((11)/10)	CF042100
2545	6R	QA53	4C49	MPIDM	"SET Q = 1/10	CF042110
2546	10	QA54	D08C (0A61)	BAT	4,,9	CF042120
2547	6R	QA55	9E43 (00C3)	CLA	"IS THIS A POSITION MEASUREMENT?	CF042130
2548	22	QA56	6800	MPYD	0,0	CF042140
2549	26	QA57	F4090018	ADDM	0,,F(-75B-10) INCREASE MAXIMUM	CF042150
2550	30	QA59	8840	COMD	4,0	CF042160
2551	34	QA5A	D041 (0A5C)	BLE	\$10	CF042170
2552	4R	QA5B	AC40	CLAD	4,0	CF042180
2553	10R	QA5C	FC481ABC	ADDD	4,,=DF((.04)*.04B-10)	CF042190
2554	12R	QA5E	F8470070	STAD	"ADD .04 CYCLE TO Q	CF042200
2555	50	QA60	D5D0	8BK	"SAVE KICK VALUE	CF042210
2556	10R	QA61	FC481ABE	ADDD	4,,=DF(2*6076*6076/2.0950+7/2.0950+78-6)	CF042220
2557	14	QA63	D8C6 (0A5E)	SUC	"ADD 2 N MILE TO Q	CF042230
2558	14	QA63	D8C6 (0A5E)	SUC	"ADD 2 N MILE TO Q	CF042240
2559	14	QA63	D8C6 (0A5E)	SUC	"ADD 2 N MILE TO Q	CF042250
2560	14	QA63	D8C6 (0A5E)	SUC	"ADD 2 N MILE TO Q	CF042260

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CF042270

*HO42280

*HO42290

*HO42300

*HO42310

CF042320

CF042330

CF042340

CF042350

CF042360

CF042370

CF042380

CF042390

CF042400

CF042410

CF042420

CF042430

CF042440

CF042450

CF042460

CF042470

*I042480

CF042490

*042500

CF042510

135CF042520

CF042530

CF042540

CF042550

CF042560

CF042570

*I042580

CF042590

*2042600

CF042610

*HO42620

*HO42630

*HO42640

*HO42650

*HO42660

*HO42670

*HO42680

*HO42690

MEASUREMENT UPDATE X

* UPDATE STATE VECTORS WITH THIS MEASUREMENT

MEASUREMENT_UPDATE_X;

* FLAG A SET FOR FIXPOINT MEASUREMENT

13,X

2,N

2,X

2,X

2,X

2,X

2,X

2,X

2,X

2,X

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2,X

2,X

"GENERATE POINTERS TO THE FIRST

"STATE VECTOR AND THE FIRST SPARE

"STORAGE FOR NEW STATE VECTORS

"

"SET AVERAGE STATE VECTOR (XXX)

" TO ZERO

X(NN) BASE ADDR

X (I)

ZERO AVERAGE VECTOR

X(NN)

2PI AT 2**6 PI 1 LANE

"SET RESIDUAL INCREMENT = +1 LANE

X(I)

"GET STATE VECTOR - 4 ELEMENTS

"FROM MULTIPLE + 5 COMMON

"COMPUTE MEASUREMENT RESIDUAL

RESIDUAL

"READ THE MEASUREMENT RESIDUAL

"FORM (RES +/- INC)**2 FOR

"TESTING AGAINST KICK LIMIT

(Y-MX)**2

K(MPMIT)+C)

"IS THIS RESIDUAL

"INSIDE THE ACCEPTABLE LIMIT?

"IS THIS A

"POSITION FIX THAT HAS ALREADY

"CAUSED A KICK?

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0A64 F4081C27

0A66 F42A0C84

0A68 4424

0A69 842D

0A6A 9424

0A6B A430

0A6C 8480

0A6D F4871C1E

0A6F A442

0A70 FCBA1AC0

0A72 C003

0A73 F80D08AD

0A75 F4081CED

0A77 F80D08ED

0A79 FC5A0J76

0A7B AC75

0A7C 6877

0A7D F8780070

0A7F D140 (0A90)

0A80 D0AF (0A90)

0A82 0000

0A84 0000

0A86 0000

0A88 0000

0A8A 0000

0A8C 0000

0A8E 0000

0A90 0000

0A92 0000

0A94 0000

0A96 0000

0A98 0000

0A9A 0000

0A9C 0000

0A9E 0000

0A9F 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AAA 0000

0AAB 0000

0AAC 0000

0AAE 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

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0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

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0AA8 0000

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0AA4 0000

0AA6 0000

0AA8 0000

0AA0 0000

0AA2 0000

0AA4 0000

0AA6 0000

0AA8 0000

0AA0

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2578 4R 0A81 AC05

2579 20 0A82 6808

2580 24 0A83 D055 (0A89)

2581 4R 0A84 A88B

2582 10 0A85 C4C30ADE

2583 10R 0A87 FC5A0C76

2584 6R 0A89 04080ADE

2585 6R 0A88 C003

2586 14 * 0A8C F80D08A0

2587 18 0A8E BC5B

2588 22 0A8F D9C5 (0A7B)

2589 18R 0A90 F4580010

2590 20 0A92 9C38

2591 28 0A93 F40A1CE7

2592 4R 0A95 AC68

2593 14 0A96 FD4A1CD5

2594 16 0A98 A4D0

2595 20 0A99 DQ23 (0A9D)

2596 126R 0A9A DC60

2597 130 0A98 AC06

2598 134 0A9C D001 (0A9E)

2599 16R 0A9D 6806

2600 8R 0A9E 96F1 (00F1)

CLAD MPYD 0.5 0.11

BRL CLSD \$6 11.11

BRG \$2

CLAD 5. MEASUREMENT RESIDUAL

ENTER HERE IF IT IS DECIDED TO ELIMINATE THIS VECTOR AFTER UPDATE

ONLY INCREMENT TRACKING FILTER

MEASUREMENTS BY LANES

BAT \$2

FET 0.3

BSV ASSEMBLE_XX

A00D 5.11

BUC \$4

THIS RESIDUAL + OR - N LANES IS

NOW WITHIN ACCEPTABLE LIMITS

COMPUTE STATE VECTOR NOW AS THIS

MEASUREMENT FITS THIS VECTOR.

FETM 5.16

CLAM 3.8

CLA 13.81+18

CLAD 6.11

CLAD X4.81

CLA 13.13

FETM 5.16

CLAM 3.8

CLA 13.81+18

CLAD 6.11

CLAD X4.81

CLA 13.13

BGE \$8

DIVD 6.0

CLAD 0.6

BUC \$9

MPYD 0.6

A00D 0.1=DX(00008000)

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042700

042710

042720

042730

042740

042750

042760

042770

042780

042790

042800

042810

042820

042830

042840

042850

042860

042870

042880

042890

042900

042910

042920

042930

042940

042950

042960

042970

042980

042990

043000

043010

043020

043030

043040

043050

043060

043070

043080

043090

043100

043110

043120

ARE THE RESIDUAL

AND INCREMENT OPPOSITE IN SIGN? CF042730

CHANGE SIGN OF INCREMENT SO THAT CF042740

ALL VALUES OF RESIDUAL + OR - CF042750

N LANES INSIDE LIMIT ARE USED CF042760

IS THE INCREMENT

BACK TO + AGAIN? CF042770

(PROCESS DONE) CF042780

CF042790

CF042800

READ ORIGINAL RESIDUAL AGAIN TO CF042810

TRY RESIDUE MINUS N LANES CF042820

042830

042840

042850

042860

042870

042880

042890

042900

042910

042920

042930

042940

042950

042960

042970

042980

042990

043000

043010

043020

043030

043040

043050

043060

043070

043080

043090

043100

043110

043120

IS THIS A POSITION FIX?"

CREATE VECTOR AGAIN AS IT MAY BE

CHANGED IN EARLIER PROCESSING

INCREMENT RESIDUAL

SET UP TO GENERATE VECTOR (XX)

READ B CODE

B CODE

RESIDUAL

COMPUTE XX(I)(NEW) = XX(I)

+ RES * B (OR RES/1/8)

AS INDICATED BY B CODE FOR

THIS TERM

Y(RES)/1/8

	PAGE	127
	CF043130	R9= X(1) RA = X(NN)
	CF043140	INC CODE
	CF043150	"HAVE ALL TERMS BEEN COMPUTED?"
	% 043160	*DO 36 MILE TEST
	\$R043170	"UNLESS POSITION FIX HAS"
	% 043180	"KICKED SYSTEM?
	*2043190	"EXAMINE POSITION ERROR IN THIS
	\$R043200	"VECTOR (XX(1))*2 + (X(X(2)))*2
	CF043210	THETA**2 + THETA3**2
	CF043220	"IS THE POSITION
	CF043230	"ERROR MORE THAN 36 N MILE?
	CF043240	"(REJECT VECTOR)"
	CF043250	"EXAMINE NUMBER OF VECTORS
	CF043260	"COMPUTED SO FAR
	*2043270	"WAS THE VECTOR
	CF043280	"JUST GENERATED THE VERY FIRST?"
	CF043290	"SET UP TO TEST VECTOR
	CF043300	"FOR UNIQUENESS
	CF043310	"SET TERM COUNT TO ZERO
	*1043320	"FORM DIFFERENCE OF ONE TERM OF
	CF043330	"THE NEW VECTOR WITH CORRESPOND-
	CF043340	"ING TERM OF A VECTOR GENERATED
	CF043350	"PREVIOUSLY WITH THIS MEASUREMENTCF043360
	CF043360	"DID THE DIFFERENCE OVERFLOW?"
	CF043370	"THE VECTOR IS UNIQUE
	CF043380	"EXAMINE THE SIZE OF THE
	CF043390	"DIFFERENCE
	CF043400	"IS THE DIFFERENCE SIGNIFICANT?"
	\$R043410	"ARE THERE MORE TERMS TO TEST?"
	CF043420	"DUPLICATE"
	CF043430	"DO NOT KEEP THIS VECTOR AND TRY
	CF043440	"FOR ANOTHER
	CF043450	"INCREMENT VECTOR COUNT
	CF043460	"ARE THERE MORE
	CF043470	"VECTORS TO COMPARE AGAINST?"
	CF043480	"IS THE VECTOR
	CF043490	*
	CF043500	*
	CF043510	*
	*1043520	*
	CF043530	*
	% 043540	*
	*1043550	*

2631	6	QAC2	D05F	(QAD2)	MOD 36	05/18/76	AN/BRN-7	\$10	"STORAGE AREA FULL? (15 LIMIT)"	PAGE 122
2632	10R	QAC3	8420		*				TOD MANY ESTIMATE VECTORS	3R043560
2633	18	QAC4	7004	(0084)				2,00		4R043570
2634	36	QAC5	F4271C27					0,0N		CF043580
2635	44	QAC7	F40A1CF9					2,0X	"REDUCE TO 1 VECTOR WITH 1ST 3"	CF043590
					*			0,0,X2XX+3	"TERMS SET TO ZERO"	CF043600
									"IS THE 4TH TERM"	CF043610
2636	50	QAC9	Q4060307					\$25	"OF THE VECTOR (T ZERO DCT) OK?"	4R043620
2637	2R	QAC8	9C00					0,00	X2XX GREATER THAN .08625 MSEC/SEC	CF043630
2638	12	QACC	F0071C2A					0,0,X+3	"SET 4TH TERM TO ZERO AND OPEN"	CF043640
					*				"UP P44 BECAUSE MISFIRE ROUTINE"	CF043650
					*				"DOES NOT OPEN UP T ZERO DCT"	CF043660
					*				"GO TO MISFIRE"	CF043670
					*					CF043680
2639	20	QACE	9EF7	(00F7)				0,0,DF((-25)*.250-128+36)		CF043690
2640	32	QACF	F8071D53					0,0,P44		CF043700
2641	36	QAD1	D305	(0B07)				\$25		CF043710
					*				"THE NEW STATE VECTOR IS GOOD"	CF043720
2642	2R	QAD2	94A1					10,0,1	"INCREMENT STATE VECTOR COUNT"	4R043730
2643	8	QAD3	C00A					0,0,10	"MOVE VECTOR FROM TEMPORAY (XX)"	CF043740
2644	16	QAD4	867E	(00FF)				0,0,XX_ADD		CF043750
2645	24	QAD5	F40B1CED					0,0,XX	"TO 'PERMANENT' SCRATCH"	CF043760
2646	44	QAD7	C230					13,0		CF043770
2647	64	QAD8	7638					13,11	X(NN)	CF043780
					*				"INCORPORATE THIS VECTOR INTO"	CF043790
2648	72	QAD9	F80D0830					AVERAGE_X	"AVERAGE AND AVERAGE VARIANCE"	4R043800
2649	74	QAD8	9444					4,0,4	INC X(NN)	CF043810
					*				"RETURN TO CONSIDER ANOTHER NEW"	CF043820
2650	80	QADC	Q4000A89					\$6	"VECTOR FROM THE SAME OLD VECTOR"	CF043830
					*					4R043840
					*					4R043850
					*					4R043860
2651	2R	QADE	9434					3,0,4	"INCREMENT POINTER TO OLD STATE"	4R043870
2652	4	QADF	8032					3,0,2	"VECTORS"	CF043880
2653	10	QAE0	Q4010A70					\$17	"ARE THERE ANYMORE OLD VECTORS?"	CF043890
2654	2R	QAE2	9C90					9,0,0		4R043910
2655	4	QAE3	90A1					10,0,1		4R043920
2656	8	QAE4	D150	(QAF5)				\$19	"ARE THERE ANY NEW STATE VECTORS?"	4R043930
					*				"UPDATE THE P MATRIX"	4R043940
2657	8R	QAE5	F80D0879					MEASUREMENT_UPDATE_P		CF043950
2658	10	QAE7	A40A					0,0,10		4R043960
2659	16	QAE8	9A04	(0084)				0,0,N	"ARE THERE MORE"	4R043970
					*					4R043980

2660	20	0AE9 0034	(0AEE)	MOD 36	05/18/76	AN/BRN-7	8RG	\$52	"VECTORS THIS TIME THAN THERE WERE BEFORE?"	HH043990
2661	26R	0AEA F04C1C22		*			FET	4,,XXX+4	"SAVE THE NEW COMMON ELEMENTS FROM THE AVERAGE STATE VECTOR"	CF044000
2662	52	0AEC F4471CE8					PTR	4,,XXXX		CF044010
2663	8R	0AEE 7004 (0084)	\$52				STA	0,,N		CF044020
2664	12	0AEF 44A4					MPIM	10,,4		% 044030
2665	14	0AF0 54A3					ADDM	10,,3		CF044040
2666	6R	0AF1 A792	\$18				CLA	IX9,2		% 044050
2667	14	0AF2 7390					STA	IX9,13	"TRANSFER ALL THE NEW VECTORS INTO THE STORAGE AREA FOR OLD VECTORS"	CF044070
2668	22	0AF3 C493 (0AF1)	*				8XU	9,,\$18		CF044080
2669	38R	0AF4 D500	\$30				8BK	13	"EXIT"	% 044100
2670	4R	0AF5 D186 (0B0C)	\$19				BAT	\$83	"MEASUREMENT COMPLETE"	CF044110
2671	10R	0AF6 F0A1AC2					CLAD	0,,=DF((.15)*.158-10)	"IS THIS A POSITION FIX?"	CF044120
2672	20	0AF8 F808007C	*				CGMD	0,,CONNIE		% 044130
2673	24	0AFA D057 (0B02)					BRL	\$24	"IS THE ACCEPT"	% 044150
2674	10R	0AF8 FC080070					ADDO	0,,CONNIE	"LIMIT LESS THAN (.15 CYCLE)**2?"	% 044160
2675	22	0AFD F8070070	*				STAO	0,,CONNIE	"INCREMENT ACCEPTABLE LIMIT BY (.15 CYCLE)**2 AND TRY AGAIN TO GENERATE STATE VECTORS"	% 044170
2676	34R	0AFF D700	\$23				PRN	13		% 044220
2677	40	0B00 04000A64					BUC	MEASUREMENT_UPDATE_X		CF044230
2678	4R	0B02 D0E4 (0B07)	*				BDT	\$25	"IS THIS A GOOD"	% 044240
2679	4R	0B03 FC0909F8	\$28				CLAM	0,,TRACKING_FILTER_MEASUREMENT\$10	"TRACKING FILTER MEASUREMENT?"	% 044250
2680	8R	0B05 71E1	\$27				STA	X14,,1		% 044260
2681	46	0B06 D500					8BK	13	"MODIFY RETURN TO TRACKING FILTERCF044280"	CF044270
2682	4R	0B07 DC84 (0B0C)	\$25				BAT	\$83	"MEASUREMENT TO BYPASS ANYMORE"	CF044280
2683	4R	0B08 D0D3 (0B0C)					BCF	\$83	"PROCESSING OF THIS FREQ"	CF044290
2684	5R	0B09 9E36 (0B06)					CLA	0,,STATION_NUMBER	"PUT NEW RETURN ADDRESS IN R14"	CF044300
2685	12	0B0A 9A4C (0B0C)	*				COM	0,,BASE+1	"SUBROUTINE STACK"	CF044310
2686	16	0B0B D869 (0B03)	*				BRE	\$28	"RETURN"	CF044320
2687	2R	0B0C 9C01	\$83				CLAM	0,,1	"IS THIS A POSITION FIX?"	CF044330
									"IS THIS PHASE DIFFERENCE?"	CF044340
									"IS THIS THE BASE STATION?"	% 044350
									"(NO MISFIRE)"	% 044360
									"INCREMENT MISFIRE COUNT"	% 044370
										% 044380
										CF044390
										CF044400
										CF044410

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2688	10	0800	F40B1CFF	ADD	0,, MISFIRE_CNT	PAGE 125
2689	20	080F	F0071CFF	STA	0,, MISFIRE_CNT	CF044420
2690	42	0811	F82C0C39	FETD	2,, NOISE	CF044430
2691	46	0813	DC82 (0816)	BAT	\$32	3S044440
					"READ P33 KICK VALUE	CF044450
					"IS THIS A POSITION FIX?"	044460
2692	10R	0814	FC0A1D00	CLAD	MOD 8	CF044470
					* \$35	CF044480
					* \$32	CF044490
2693	10R	0816	F8081D17	COMD	0,, P11	CF044500
2694	14	0818	D052 (0816)	BRL	\$33	CF044510
2695	12R	0819	F8071D17	STAD	0,, P11	CF044520
2696	10R	0818	F8081D28	COMD	0,, P22	CF044530
2697	14	0810	D052 (0820)	BRL	\$34	CF044540
2698	12R	081E	F8071D28	STAD	0,, P22	CF044550
2699	10R	0820	D710	PRN	1	CF044560
2700	24	0821	FC071D3F	PTRD	0,, P33	044570
2701	28	0823	D089 (082D)	BAT	\$26	* 044580
2702	8R	0824	F40A006F	CLA	0,, DF_MKR	* 1044590
					*	CF044600
2703	12	0826	D013 (082A)	BNE	\$20	CF044610
2704	12R	0827	8430	FETM	3,, 0	CF044620
2705	34	0828	F4371D07	PTR	3,, DF_COUNTER	CF044630
					*	CF044640
2706	4R	082A	FC090A01	CLAM	0,, TRACKING_FILTER_MEASUREMENT\$92	CF044650
					\$20	CF044660
					*	CF044670
					*	CF044680
					*	CF044690
2707	8	082C	DA08 (0805)	BUC	\$27	* 044700
2708	2R	082D	9C02	CLAM	0,, 2	CF044710
					*	CF044720
					*	CF044730
2709	8	082E	B5E1	ADD	X14,, 1	CF044740
2710	12	082F	DA08 (0805)	BUC	\$27	CF044750

"READ P33 KICK VALUE
"IS THIS A POSITION FIX?"
"READ SIGMA KICK FOR USE AS A
"LOWER LIMIT ON P11 AND P22
"EXAMINE P11"
"IS SIGMA KICK LESS THAN P11?
"SET P11 = SIGMA KICK
"EXAMINE P22
"IS SIGMA KICK LESS THAN P22?
"SET P22 = SIGMA KICK
"SAVE NEW P33"
"IS THIS A POSITION FIX?"
"IS KALMAN IN
"DIFFERENCE FREQUENCY NOW?
"RESET FREQUENCY PAIR SELECT
"COUNTERS FOR ALL STATIONS TO
"ALWAYS START DIFF FREQ WITH
"11-10 DIFF IF 3 FREQ AVAILABLE
"MODIFY RETURN TO TRACKING FILTER
"MEASUREMENT TO BYPASS ANYMORE
"MEASUREMENTS FROM THIS STATION
NO MEASUREMENT
"MODIFY THE RETURN TO POSITION
"MEASUREMENT TO INDICATE A
"MISFIRE

446
AVERAGE X

* THIS ROUTINE WILL COMPUTE AN AVERAGE STATE VECTOR. EACH TIME THIS
* ROUTINE IS CALLED IT WILL UPDATE THE AVERAGE WITH ONE STATE VECTOR.
* IT ALSO GENERATES THE VARIANCE OF EACH ELEMENT OVER THE SET OF STATE
* VECTORS. THE ARGUMENTS CONSIST OF POINTERS TO THE NEW VECTOR (XB) AND
* THE AVERAGE VECTOR (XC) AND THE NUMBER OF THE NEW VECTOR (N). THE
* RESULTS ARE LEFT IN XXX (AVERAGE) AND X2XX (VARIANCE)

* X X(A) + (X(B) - X(C))/N = X(A)NEW

* R2 = N

* R1 = X(C) ADDR

* R0 = X(B) ADDR

AVERAGE_X FET 0,XXX_ADD

9,8

7,1

4,13

6,4

13,X2XX

IX8,11

IX8,12

4,0

4,4

4,6

14,13

2,4

2,6

4,2

14,13

0,6

IX8,10

IX8,10

13,1

8,11

13

0830 867F (00FF)

0831 8498

0832 8C71

0833 A44D

0834 DC64

0835 FCD91CF6

0837 A788

0838 B38C

0839 AC40

083A 6844

0838 6846

083C B64D

083D AC24

083E 6826

083F B842

0840 7240

0841 6006

0842 878A

0843 738A

0844 94D1

0845 C48F (0837)

0846 D500

2711 8R

2712 32

2713 34

2714 36

2715 162

2716 166

2717 6R

2718 12

2719 16

2720 32

2721 48

2722 54

2723 56

2724 74

2725 78

2726 86

2727 92

2728 98

2729 106

2730 108

2731 116

2732 38R

I LIM

1=R6,7

N=R4,5

*COMPUTE I/N

"PROCESS THE ITH TERM"

"

"XXX = XXX + (XB - XC)/N

"

DX*DX/N

X2XX

"X2XX = X2XX + ((XB - XC)**2)/N

" + (X2XX + ((XB - XC)**2)/N)/N

(1-1/N)

X2XX

DX/N

XXX (1)

INC X2XX ADDR

"ARE THERE MORE TERMS TO PROCESS?CF045100

"EXIT"

CF045110

CF044760

*HO44770

*HO44780

*HO44790

*HO44800

*HO44810

*HO44820

*HO44830

*HO44840

*HO44850

CF044860

CF044870

CF044880

CF044890

CF044900

CF044910

CF044920

CF044930

CF044940

CF044950

CF044960

CF044970

CF044980

CF044990

CF045000

CF045010

CF045020

CF045030

CF045040

CF045050

CF045060

CF045070

CF045080

CF045090

CF045100

CF045110

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**
* THETA C RETURNED IN R0,1 2 REGS PRUNED
* R0 = STA R1 = FREQ R2,3 = THETA 1
* ANSWER CORRECTED FOR DELTA T KI * PHI BASE
* THETA C
*
* THIS ROUTINE WILL COMPUTE THE PREDICTED PHASE FROM A STATION TO THE
* CRAFT FOR ANY FREQUENCY. IN PHASE DIFFERENCE NAVIGATION A CORRECTION
* TERM IS ADDED. THIS TERM IS THE TIME BETWEEN BASE STATION BURSTS AND
* THIS STATION'S BURSTS TIMES THE PHASE ESTIMATE IN THE BASE STATION
* TRACKING FILTER FOR THIS FREQUENCY. THE ARGUMENTS CONSIST OF THETA 1,
* FREQUENCY AND STATION NUMBER.
*
*
* THETA_C
*
* 2733 16R 0847 CC53 0848 F9361682 5,3 REPEAT THETA 1
* 2734 36 0848 F9361682 X3,,LAMBDA_TABLE "CONVERT THETA1 TO CYCLES FOR
* 2735 56 084A F8061AC4 0,,=DF(3.141592658-2)
* 2736 60 084C 8C00 0,0 "THIS FREQUENCY SCALED B10
* 2737 64 084D 4423 MPIM 2,,3
* 2738 70 084E F0354000 RSL 3,,1
* 2739 72 0850 8423 ADD 2,3
* 2740 86 0851 F98C1D0F X6,,PP_THETA2 "FORM THETA1 + THETA2 + THETA3
* 2741 96 0853 F1961768 X9,,TF_LAMBDA_CONSTANT_TABLE
* 2742 106 0855 FD481C89 X4,,PP_THETA3 " SCALED B10
* 2743 116 0857 F8040400 RSAD 0,,5
* 2744 120 0859 8C20 ADD 2,0
* 2745 124 085A ACA2 CLAD 10,2
*
*
* 2746 128 085B D0D5 (0861) "IS THIS"
* 2747 2R 085C A418 BCF $1 "PHASE DIFFERENCE NAVIGATION?"
* "SUB ALWAYS PHASE DIFFERENCE
* STA
* "SET UP STATION NO AND FREQ
* "ARGUMENT FOR D PHI KI ROUTINE
* FREQ
* "COMPUTE DELTA PHI CORRECTION
* D_PHI_KI
* 10,0 "THETA C = SUM THETA(1) + D PHI
* " SCALED 810 CYCLES
* 2751 30R 0861 D550 B3K 9 "EXIT"
* $1

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CF045120
 CF045130
 CF045140
 CF045150
 *H045160
 *H045170
 *H045180
 *H045190
 *H045200
 *H045210
 *H045220
 *H045230
 *H045240
 CF045250
 CF045260
 CF045270
 CF045280
 CF045290
 CF045300
 CF045310
 CF045320
 CF045330
 045340
 CF045350
 CF045360
 CF045370
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 *1045390
 *R045400
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*H045530
*H045540
*H045550
*H045560
*H045570
*H045580
CFO45590
CFO45600
CFO45610
CFO45620
CFO45630
045640
045650
045660
045670
CFO45680
CFO45690
*O45700
CFO45710
*O45720
*S045730
CFO45740
CFO45750
CFO45760
*O45770
CFO45780
*S045790
CFO45800
CFO45810

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** ENTER WITH RO = STA NUMBER

R1 CONTAINS ADDRESS OF R1J TO BE USED

* RETURN THETA 1 IN RO,1

* COMPUTE THETA1

* THIS ROUTINE COMPUTES THE CENTRAL ANGLE BETWEEN ANY STATION AND THE CRAFT. THE ARGUMENTS CONSIST OF THE STATION NUMBER AND A POINTER TO THE POSITION VECTOR OF THE CRAFT.

COMPUTE_THETA1:

MPIM 0,,6

ADDM 0,,STATION_VECTOR_TABLE

FET 1,1 "READ R1 VECTOR AND CONVERT TO GEOCENTRIC COORDINATES"

FETD 14,1

* 1960 FISHER EQ RADIUS = 6378166.0 METERS = A = 20925761.47 FEET

* POLAR RADIUS= 6356784.293 = B = 2085591.48 FEET

* B**2/A**2 = 0.9933065781

MPYD 0,,=OF(0.9933065781)

FETD 4,5 REPEAT R1

FETD 16,12

BSV REGISTER_CROSS

FETD 4,5

BSV REGISTER_DOT

SQRT 0,0 "SIN(THETA) = MAG (S X R1)"

CLAD 10,0 "

PRN 3 "COS(THETA) = R1 * S

FETD 14,8

BSV REGISTER_DOT

ATAN 0,,0

CLAD 2,0 "THETA1 = ARCTAN SIN/COS AT PI

BBK 1

*

2752

2752 4R

2753 8

2754 16

2755 44

2756 64

2757 80

2758 116

2759 124 *

2760 140

2761 148 *

2762 594

2763 598

2764 612

2765 640

2766 648 *

2767 1186

2768 1190

2769 1204

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CF045820

CF045830

*H045840

*H045850

*H045860

*H045870

CF045880

CF045890

CF045900

CF045910

CF045920

CF045930

CF045940

CF045950

CF045960

CF045970

CF045980

* 045990

CF046000

* 046010

CF046020

CF046030

CF046040

* 046050

CF046060

* 046070

* 046080

* 046090

*S046100

CF046110

CF046120

CF046130

CF046140

CF046150

CF046160

CF046170

* 046180

CF046190

* 046200

* 046210

* 046220

CF046230

CF046240

MEASUREMENT UPDATE P

* UPDATE THE COVARIANCE MATRIX IF NEW STATE VECTORS WERE GENERATED.

MEASUREMENT_UPDATE_P;

REG_SETUP

"SET UP POINTERS AND COUNTERS

"UPDATE P"

"COMPUTE (B)(M)(P)

"(M)(P) IS AVAILABLE FROM THE

" Q COMPUTATION

"

" USE B CODE TO CONTROL THE

" MULTIPLY BY (B)

CODE

6, 81

5, 81+18

4, 5

9, 7

IX9, 13

2, 0

IX7, 6

5, 0

\$4

\$5

\$5

2, 0

IX7, 12

"COMPUTE (E)(M)TRANPOSE"

"IS (E)(M)T ZERO?"

BI

IX9, 6

6, 0

"COMPUTE (E)(M)T(B)

"

"USE B CODE TO CONTROL THE

"MULTIPLY BY (B)

\$6

2, 0

\$7

2, 0

1

0, 2

IX9, 11

"COMPUTE P(NEW)"

2770

2770

3R *

0879 F8008F8

2771

2772

2773

2774

2775

2776

2777

2778

2779

2780

2781

2782

2783

12

20

2R

4

8R

12

20

22

26

16R

20

126R

8R

0878 FC691CD5

087D F45A1CE7

087F A445

0880 A497

0881 AF9D

0882 AC20

0883 AF76

0884 9850

0885 DC52 (0888)

0886 6820

0887 D0C1 (0889)

0888 DC20

0889 AF7C

\$3

\$2

\$4

\$5

CLAM

CLA

CLA

CLA

CLAD

CLAD

CLAD

CGMM

MPYD

BUC

DIVD

CLAD

MPYD

BRE

FETO

CGMM

BRL

MPYD

BUC

DIVD

PRN

SUBD

ADD

2788

2789

2790

2791

2792

2793

2794

18

16R

20

126R

10R

4R

12

088F D052 (0892)

0890 6820

0891 D0C1 (0893)

0892 DC20

0893 D710

0894 8802

0895 8F9B

\$6

\$7

\$6

\$7

\$1

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 CF046250
 CF046260
 * 046270
 CF046280
 CF046290
 * 046300
 CF046310
 CF046320

"
 " = P - (B)(M)(P) + (E)(M)T(B)
 "FORCE P TO BE SYMMETRICAL"
 "EXIT"

IX9.11
 4,4
 9,12
 11,18
 5,5
 7,13
 P_SYM
 13

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 STAD
 ADD
 BXUD
 ADDM
 ADD
 BXUD
 BSV
 BBK

0896 7898
 0897 8444
 0898 C098 (0881)
 0899 F489C012
 0898 8455
 089C C07E (087F)
 089D F80008D6
 089F D5D0

22
 24
 32
 48
 6
 14
 8R *
 46

2795
 2796
 2797
 2798
 2799
 2800
 2801
 2802

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CF046330

ASSEMBLE STATE VECTOR

*H046340

*H046350

*H046360

*H046370

*H046380

*H046390

CF046400

CF046410

CF046420

CF046430

* THIS ROUTINE WILL BUILD A SINGLE 9 ELEMENT STATE VECTOR (XX) FROM ONE
* OF THE 4 ELEMENT MULTIPLE VECTORS AND THE 5 ELEMENT COMMON VECTOR
* (XXXX). THE ARGUMENT IS A POINTER TO THE MULTIPLE VECTOR.

2803	26R	08A0 F04C1CE8	ASSEMBLE_XX	FET	4,XXXX	"READ 5 COMMON ELEMENTS
2804	46	08A2 C235		FET	13,5	"READ 4 UNIQUE ELEMENTS
2805	88	08A3 F487ICED		PTR	8,XX	"SAVE NEW 9 ELEMENT VECTOR
2806	100	08A5 D500		BBK	0	

PHI (P) PHI TRANSPOSE

THIS ROUTINE MULTIPLIES PHI BY (X), (P), OR (P)TRANSPOSE. THE RESULT REPLACES THE ORIGINAL MULTIPLIER. THE 14 PHI ELEMENTS CONSIST OF
O, O, PHI(1,8), O, O, O, PHI(2,9), PHI(3,4), PHI(5,5), PHI(6,6),
PHI(7,7), PHI(8,8) AND PHI(9,9). THEY ARE ORDERED BY THE SEQUENCE OF
USAGE WHEN ACCESSING PHI COLUMN BY COLUMN. THE UNITY TERM OF THE
DIAGONAL ELEMENTS DOES NOT APPEAR AS IT IS HANDLED SEPARATELY.

* ENTER HERE WITH J = 18 AND I = 2
* TO MULTIPLY BY P. ENTER HERE

* WITH $J = 2$ AND $I = 18$ TO MULTIPLY

* BY P TRANSPOSE

PHI_P_PHIT	FETM	12,P_MATRIX
	CLAM	11,8

ENTER HERE WITH I = 1. POINTER TO

* X, 13 REGISTERS AND COUNTER K=1

* TO PROCESS X (J IS NOT USED)

CLAM 9.16

CLA	7.9
-----	-----

CLAM 3,,KAL_TEMP

\$5 CLAM 5, PHI_MATRIX

CLA 4,12

\$3	CLA	0,6
-----	-----	-----

0,1	0,1
X0, PHI_CODE	X0, PHI_CODE
CLA	CLA

CLA	2.0
-----	-----

0,0
0,0

STAD IX6,3

\$2	CDMM	2,00
-----	------	------

— 2 —

CLAD 10.4

COMM 11,000

BNE \$7

CLAM 1,900

2A21 6 083A 0059 (08C3)

2922 8R 0883 AF04

2823	10	098C	9640
------	----	------	------

2824 14 0380 0011 (088F)

2825 2R 088E 9C10

2807	32R	08A6	F4CAID17
2808	34	08A8	9CB8

2809	4R	08A9	FC990010
2910	6	08AB	A479
2811	10	08AC	FC391C06
2812	4R	08AE	FC59005C

2813	6	08B0	A44C
2814	2R	08B1	A406
2815	8	08B2	F0044000
2816	16	08B4	F50A0C30
2817	18	08B6	A420
2818	22	08B7	B800
2819	32	08B8	7863
2820	2R	08B9	9820

2821	6
2822	8R
2823	10
2824	14
2825	2R

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2826	18R	08BF	6A05		MPYD	IO,5	"CLEAR LOWER HALF OF DOUBLE	CF046870
2827	26	08C0	8F63		ADD	IX6,3	"REGISTER AS X IS ONLY 16 BITS	CF046880
2828	36	08C1	7863		STAD	IX6,3	"FORM PRODUCT OF MULTIPLIER	CF046890
2829	38	08C2	9452		ADD	5,2	"ELEMENT AND PHI(N,M)	CF046900
2830	2R	08C3	8422		ADD	2,2	"ADD RESULT TO THE MTH TERM OF	CF046910
2831	4	08C4	8440		ADD	4,13	"TEMP	CF046920
2832	12	08C5	CC80	(08F9)	BXUD	8,\$2	"INCREMENT PHI MATRIX POINTER TO	CF046930
2833	2R	08C6	A44C		CLA	4,12	"THE NEXT ELEMENT OF PHI	CF046940
2834	10	08C7	CD67	(08B1)	BXUD	6,\$3	"SHIFT PHI CODE 1 TO GET READY	CF046950
2835	8R	08C8	AF63				"FOR THE M+1 ELEMENT	CF046960
2836	10	08C9	9880				"ADD 1 TO MULTIPLIER POINTER TO	CF046970
2837	14	08CA	D014	(08CF)			"SEQUENCE TO THE M+1 ELEMENT OF	CF046980
2838	6R	08CB	B6C4				"ROW OR COLUMN K. I=2 FOR P ROWS,	CF046990
2839	14	08CC	96F1	(00F1)			"I=18 FOR P COLUMNS AND I=1 FOR	CF047000
2840	22	08CD	7204				"INCREMENT M	*1047010
2841	26	08CE	DC02	(08D1)			"ARE THERE MORE ELEMENTS?"	CF047020
2842	3R	08CF	BE04				"COPY POINTER TO MULTIPLIER (P,X)	CF047030
2843	18	08D0	7AC4				"TO START THE PROCESS OVER FOR	CF047040
2844	2R	08D1	8440				"THE N+1 COLUMN OF PHI	CF047050
							"INCREMENT N	*2047060
							"ARE THERE MORE COLUMNS OF PHI	CF047070
							"TO PROCESS?	CF047080
								*1047090
								*1047100
								*1047110
								*1047120
								CF047130
								CF047140
								CF047150
								CF047160
								CF047170
								CF047180
								CF047190
								CF047200
								CF047210
								CF047220
								CF047230
								CF047240
								CF047250
								CF047260
								CF047270
								CF047280
								CF047290

THE MULTIPLICATION IS COMPLETE

EXCEPT FOR THE UNITY TERM IN

THE PHI DIAGONAL ELEMENTS.

NOTE - M, N ARE RESET NOW

CLAD IX6,3

COMM 11,0

BNE \$8

ADD IO,4

ADD IO,4

ADD IO,4

STA IO,4

BUC \$9

ADD IO,4

STAD IO,4

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

ADD 4,13

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 *1047300
 *1047310
 *1047320
 *1047330
 *1047340
 *1047350
 *1047360
 *1047370
 *1047380
 *1047390
 *1047400
 *1047410

"INCREMENT M
 "ARE THERE MORE ELEMENTS?"
 "ADD J TO P MATRIX POINTER TO
 "SEQUENCE TO THE K+1 ROW OR
 "COLUMN OF P (J=18 FOR COLUMNS
 "AND J=2 FOR ROWS)
 "INCREMENT K
 "ARE THERE MORE ROWS OR COLUMNS
 "OF P TO PROCESS?
 "EXIT"

6.,\$4
 112.15
 10.,\$5
 14

AS K ONLY COUNTS TO 1
 ADD
 BXU
 88K

*

(08C8)
 (08CF)
 (08AE)

08D2 CC6B
 08D3 B6CF
 08D4 C6A7
 08D5 D5E0

10
 6R
 14
 40R

2845
 2846
 2847
 2848

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2849	22R	08D6	F478D17	P_SYM	FETM	7,P_MATRIX	"SET P(M,N) = P(N,M) FOR	PAGE 135
2850	26	08D8	FC690010		CLAM	6,16	"	CF047420
2851	28	08DA	A446		CLA	4,6	"	CF047430
				*			"	CF047440
				*			"	CF047450
				*			"	CF047460
				*			"	CF047470
				*			"	CF047480
				*			"	CF047490
				*			"	CF047500
				*			"	CF047510
2852	2R	08D8	A427	\$3	CLA	2,7	"	CF047520
2853	6	08DC	F4290012		ADDM	2,18	"	CF047530
2854	14	08DE	AE07		CLAD	10,7	"	CF047540
2855	18	08DF	Q027 (08E7)		BGE	\$1	"	CF047550
2856	4R	08E0	B800		SUBD	0,0	"	CF047560
2857	14	08E1	7A07		STAD	10,7	"	CF047570
2858	18	08E2	D004 (08E7)		BUC	\$1	"	CF047580
2859	8R	08E3	AF37	\$2	CLAD	IX3,7	"	CF047590
2860	18	08E4	7A02		STAD	10,2	"	CF047600
2861	22	08E5	F4290012		ADDM	2,18	"	CF047610
2862	8R	08E7	CC35 (08E3)	\$1	BXUD	3,12	"	CF047620
2863	4R	08E8	F4790014		ADDM	7,20	"	CF047630
2864	6	08EA	9042		SUBM	4,2	"	CF047640
2865	14	08EB	C051 (08D6)		BXUD	5,13	"	CF047650
2866	26R	08EC	D570		B8K	7	"	CF047660

* THIS ROUTINE WILL FORCE THE P MATRIX TO BE SYMETRIC AND THE DIAGONAL
* ELEMENTS TO BE POSITIVE

"SET P(M,N) = P(N,M) FOR
" M UNEQUAL N
"SET P(M,N) = 0 IF N = M
" AND P(M,N) MINUS

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CF047670

MEASUREMENT RESIDUE

* THIS ROUTINE COMPUTES THE RESIDUE Y - (M)(X). THE ARGUMENT CONSISTS
* OF A POINTER TO X.

* X ADDRESS IN RO UPON ENTRY RO PRUNED 444

Y_MINUS_MX FETM 5,16

\$1 CLAM 1,0

CLS 10,6

MPYD X4,M_MATRIX "COMPUTE -(M)(X)

ADD ADD "ADD MEASUREMENT (Y)

ADDM 6,1 "SAVE RESIDUE

BXUD 4,1

ADD 2,MEASUREMENT

STAD 2,MEASUREMENT_RESIDUAL

BBK 6

REGISTER SET UP

* THIS ROUTINE WILL CREATE 14 REGISTERS AND SET UP COMMON POINTERS

* D = KAL TEMP

* C = M_MATRIX

* B = P_MATRIX

* A = 16

* 9 = 0

* 8 = 16

* 7,6,5,4,3,2,1 = 0

REG_SETUP FETM

CLAM

CLAM

CLAM

CLA

BBK

13,KAL_TEMP

12,M_MATRIX

11,P_MATRIX

10,16

8,10

15

"CREATE REGISTERS

"SET POINTER TO TEMP VECTOR

"SET POINTER TO M_MATRIX

"SET POINTER TO P_MATRIX

"SET UP TWO 9 COUNTERS

OBED F4580010

OBED 9C10

OBED A206

OBED F946004A

OBED 8C20

OBED 9461

OBED CC47 (08EF)

OBED FC280074

OBED F8270076

OBED D560

18R

2R

8

28

32

34

42

10R

22

46

2867

2868

2869

2870

2871

2872

2873

2874

2875

2876

34R

38

42

46

48

56

2877

2878

2879

2880

2881

2882

OBED F4081C06

OBED FCC9004A

OBED FC891D17

OBED FCA90010

OBED 448A

OBED D5F0

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2899	14	OC18 9031	*	SUBM	3,1	"BURST TIME "DECREMENT STA REF BY 1 TO PRE- "PARE TO ADD IN THE NEXT TIME IF "LOOP IS NOT COMPLETE	CF048450 %S048460 CF048470 CF048480
2900	18	OC19 D828 (OC12)	*	BGE	\$3	"IS STA REF - 1	*1048490
2901	48	OC1A D8QA (OC11)	*	BUC	\$2	"OUTSIDE OF THE RANGE 0 TO 77	*R048500
2902	48	OC13 FC1907D0	\$4	CLAM	1,2000	"STA REF MUST BE IN RANGE 0 TO 7	CF048510
2903	36	OC1D D401	*	DIV	0,1	"COMPUTE D PHI"	CF048520
2904	40	OC1E 4443		MPIM	4,3	"= (DELTA T / 10 SEC) * PHI	CF048530
2905	42	OC1F 8445		ADD	4,5	" ESTIMATE(BASE)	CF048540
2906	62	OC20 F9461EA3		MPYD	X4, PHI_ESTIMATE	" BASE	CF048550
2907	66	OC22 AC50		CLAD	5,0	" FREQ	CF048560
2908	86	OC23 D540		88K	4	"	CF048570 CF048580 CF048590

2909	OC24	A4FA4FA5	BETA_NRA	COND	F(((1-1)/.05)/36008-7)	CF048600
2910	OC26	A4FA4FA5	BETA_LOG	COND	F(((1-1)/.05)/36008-7)	CF048610
2911	OC28	A4FA4FA5	BETA_PSEUDO	COND	F(((1-1)/.05)/36008-7)	CF048620
2912	OC2A	00024200	SIGMA_NRA	COND	F(((120)*20)*1.7)*1.78-24)	CF048630
2913	OC2C	00000001	SIGMA_LOG	COND	F(((103)*03)*1.7)*1.78-24)	CF048640
2914	OC2E	00000080	SIGMA_PSEUDO	COND	F(((110)*10)*1.7)*1.78-24)	CF048650
2915	OC30	3E7F	PHI_CODE	CON	X(3E7F)	CF048660
2916	OC31	3E7F		CON	X(3E7F)	CF048670
2917	OC32	FFFF		CON	X(FFFF)	CF048680
2918	OC33	FFFF		CON	X(FFFF)	CF048690
2919	OC34	F7FF		CON	X(F7FF)	CF048700
2920	OC35	F8FF		CON	X(F8FF)	CF048710
2921	OC36	F0FF		CON	X(F0FF)	CF048720
2922	OC37	FEFF		CON	X(FEFF)	CF048730
2923	OC38	FF7F		CON	X(FF7F)	CF048740
2924	OC39	011A303E	NOISE	COND	F(120*6076*20*6076/2.095D+7/2.095D+78-8)	CF048750
2925	OC3B	2AAAAAAB		COND	F(11)/31	CF048760
2926	OC3D	04690000	DATA_TABLE	COND	X(04690000)	CF048770
2927	OC3F	04690000		COND	X(04690000)	CF048780
2928	OC41	40000000		COND	X(40000000)	CF048790
2929	OC43	018E7000	* M_4_TABLE	COND	F(110)*10.20038-23)	CF048800
2930	OC45	02134000		COND	F(110)*13.60038-23)	CF048810
2931	OC47	018A5400		COND	F(110)*11.30038-23)	CF048820
						CF048830
						CF048840

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PP048850

PROPAGATION PREDICTION

* * * THIS PROGRAM WILL COMPUTE THE PREDICTED SPHEROIDAL AND PROPAGATION
* * * CORRECTIONS TO THE NOMINAL PREDICTED PHASE MEASUREMENTS FROM A GIVEN
* * * STATION. IT ALSO COMPUTES AN ASSOCIATED VARIANCE. THE THREE PARA-
* * * METERS ARE COMPUTED FOR ALL 3 FREQUENCIES AND SAVED IN MEMORY FOR EACH
* * * STATION. THE TOTAL LANE COUNT FROM THE CORRECTED PREDICTED PHASE
* * * REPLACES ANY LANE COUNTS CONTAINED IN THE MEASURED PHASE IN THE
* * * TRACKING FILTER. THE STATION NUMBER IS THE ONLY ARGUMENT.

ENTER WITH STATION NUMBER IN R0

PROPAGATION_PREDICTION;

2932	14R	0C49	F4381C63	FETM	3,,PROP_PRED_RESULTS	048980
2932	18	0C48	FC29001A	CLAM	2,,26	048990
2933	9R	0C40	7313	STA	IX1,3	049000
2935	16	0C4E	C412 (0C4D)	BXU	1,,\$10	049010
2936	2R	0C4F	9C26	CLAM	2,,6	049020
2937	6	0C50	6424	MPI	2,4	049030
2938	16	0C51	D710	PRN	1	049040
2939	22	0C52	967E (00FE)	ADD	0,,SV_ADD	049050
2940	30	0C53	E67D (00FD)	FET	0,,RIJ_ADD	049060
2941	36	0C54	C003	FET	0,3	049070
2942	44 *	0C55	F80D0862	BSV	COMPUTE_THETA1	049080
2943	54	0C57	780D (008D)	STAD	0,,INTEGRATION_COUNTER	049090
2944	82	0C58	C252	FET	15,2	82 049100
2945	120	0C59	F07C1F69	FET	7,,RI1	PP049110
2946	128	0C58	F80D1714	BSV	GET STATION VECTOR AGAIN	PP049120
2947	144	0C5D	C055	FET	GET 2 WORDS THEN R1 VECTOR	PP049130
2948	160	0C5E	6800	MPYD	REGISTER_CROSS	PP049140
2949	176	0C5F	6822	MPYD	STA CROSS R1	PP049150
2950	192	0C60	6844	MPYD	DUP STA CROSS R1	PP049160
2951	196	0C61	BC02	ADD		PP049170
2952	200	0C62	8C04	ADD		PP049180
2953	646	0C63	1000	SQRT		PP049190
2954	652	0C64	4C02	LSAO		PP049200
2955	778	0C65	DC60	DIVD	0,,1	PP049210
2956	904	0C66	DC80	DIVD	6,0	PP049220
2957	1030	0C67	DCA0	DIVD	8,0	PP049230
2958	1032	0C68	A4DA	CLA	-AX1	PP049240
2959	1034	0C69	A4C8	CLA	-AX2 AT 81	PP049250
2960	1036	0C6A	A4B6	CLA	-AX3	PP049260
					SINGLE PRECISION AX	PP049270

(STAXR1 DOT STAXR1)

-AX1
-AX2 AT 81
-AX3
SINGLE PRECISION AX

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2961	1064	OC68	D7A0	PRN	10	INITIAL P = STATION VECTOR	PP049280
2962	1092	OC6C	C255	FET	15.5	SINGLE PRECISION	PP049290
2963	1094	OC6D	A454	CLA	5.4	P3 AT B1	PP049300
2964	1100	OC6E	F0544000	RSA	5.1		PP049310
2965	1102	OC70	A442	CLA	4.2		PP049320
2966	1108	OC71	F0444000	RSA	4.1	P2 AT B1	PP049330
2967	1110	OC73	A430	CLA	3.0		PP049340
2968	1116	OC74	F0344000	RSA	3.1	P1 AT B1	PP049350
2969	1128	OC76	D720	PRN	2		PP049360
2970	1146	OC77	F02C16AC	FET	2.1	2.1 NORTH_MAGNETIC_POLE_VECTOR AT B0	PP049370
2971	1152	OC79	G006	MPY	0.6		PP049380
2972	1158	OC7A	G017	MPY	1.7		PP049390
2973	1164	OC7B	G028	MPY	2.8		PP049400
2974	1166	OC7C	B421	ADD	2.1		PP049410
2975	1168	OC7D	B420	ADD	2.0	A2 AT B1	PP049420
							PP049430
							PP049440
							PP049450
							049460

GET SEASON INDEX

2976	1180	OC7E	869C	FETO	0. TIME	AND DATE FOR SUN POSITION VECTOR	049470
2977	1198	OC7F	42E7	MPYD	0.1=DF(((50-3831)/24)/3600)/1811)		049480
2978	1206	OC80	96C4	ADD	0.1 DAY SINCE JAN 1 1972 B11		049490
2979	1208	OC81	A420	CLA	2.0	SCALE DAYS AT B15	049500
2980	1214	OC82	F0240800	RSA	2.4		049510
2981	1216	OC84	DE01	FLG	8		049520
2982	4R	OC85	FC39016D	CLAM	3.365		049530
2983	2R	OC87	8023	COM	2.3	GET DAYS MOD 365	049540
2984	6	OC88	D052	BRL	\$2		049550
2985	2R	OC89	8023	SUB	2.3		049560
2986	6	OC8A	D804	BUC	\$1		049570
2987	2R	OC8B	9C3C	CLAM	3.12	DEC 16 TO DEC 31	049580
2988	6	OC8C	F829015D	COMM	2.349		049590
2989	10	OC8E	D03C	BRG	\$3		049600
2990	2R	OC8F	9C39	CLAM	3.9		049610
2991	6	OC90	F8290066	COMM	2.182		049620
2992	10	OC92	D038	BRG	\$3		049630
2993	2R	OC93	9C36	CLAM	3.6		049640
2994	6	OC94	F829001F	COMM	2.31		049650
2995	10	OC95	D034	BRG	\$3		049660
2996	2R	OC97	9C33	CLAM	3.3		049670
2997	4	OC98	982F	COMM	2.15		049680
2998	8	OC99	D031	BRG	\$3		049690
2999	2R	OC9A	9C30	CLAM	3.0		049700

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3000	4R	OC98	D086	(OCA2)	\$3	MOD 36	05/18/76	AN/BRN-7	8BF	\$82	3,, SEASON_INDEX_NORTH	SAVE NORTH VALUE	049710
3001	10R	OC9C	F0371CSF						STA	3,,	SET UP FOR	049720	
3002	14	OC9E	F4290087						ADDN	2,, 183	SOUTHERN HEMI	049730	
3003	16	OC9A	DEAD						FLG	BT+EUR+8		049740	
3004	20	OC91	D9CD	(OC85)					BUC	\$81		049750	
3005	10R	OC92	F0371CA0						STA	3,, SEASON_INDEX_SOUTH		049760	
3006	52	OC94	F08C1748		\$82				FET	8,, SUN_CONS		PP049770	
3007	68	OC96	6819						MPYD	K2,K10,K30,K5,K4,K6,-K7		049780	
3008	74	OC97	FC140010						LSAD	K1* DAYS @ P184		049790	
3009	76	OC99	8401						ADD	*K2 = LS AT PI		PP049800	
3010	92	OC9A	6839						MPYD	K3* DAYS @ P184		049810	
3011	98	OC9B	FC340010						LSAD	RESCALE TO PI		049820	
3012	100	OC9D	8436						ADD	K3*0*4 = MS @ PI		049830	
3013	110	OC9E	F8940800						RSAD	RESCALE DAYS TO B15		049840	
3014	114	OC90	F4A97FFF						ADDN	ADD 1/2 DAY TO FORM MEAN		049850	
					*					LONGITUDE OF THE SUN @ PI		049860	
3015	122	OC92	C804						FETD	GET MS		049870	
3016	130 *	OC93	F80D1656						BSV	K6*SIN(MS) @ PI IN R9		049880	
3017	136	OC95	6090						MPY	LS @ PI		049890	
3018	138	OC96	A402						CLA			049900	
3019	140	OC97	8409						ADD			049910	
3020	148 *	OC98	F80D1656						BSV	SIN(LS + K6*SIN(MS)) @ B1		049920	
3021	154	OC9A	6070						MPY	K5*SIN(LS + K6*SIN(MS)) = S1281		049930	
3022	156	OC9B	A487						CLA			049940	
3023	158	OC9C	9C80						CLAM			PP049950	
3024	174	OC9D	6877						MPYD	S1**2		PP049960	
3025	182	OC9E	9EF5	(00F5)					CLAD			PP049970	
3026	186	OC9F	8807						SUBD			PP049980	
3027	632	OC90	1000						SGRT	(1-S1**2)**.5 AT B1		PP049990	
3028	640	OC91	8410						FETM	MAKE ROOM		050000	
3029	644	OC92	9F44						CLAM	2LS		050010	
3030	652 *	OC93	F80D1656						BSV			PP050020	
3031	658	OC95	600C						MPY	-K7*SIN(2LS)		PP050030	
3032	660	OC96	8408						ADD	K6*SIN(MS)		PP050040	
3033	666	OC97	81F0						SUB	L AT PI		PP050050	
3034	1100	OC98	1400						SINCO5			PP050060	
3035	1106	OC99	6004						MPY			PP050070	
3036	1108	OC9A	8400						ADD	S2 B1		050080	
3037	1114	OC9B	6024						MPY			PP050090	
3038	1116	OC9C	A412						CLA			PP050100	
3039	1118	OC9D	8411						ADD	S3 B1		050110	
3040	1130	OC9E	7DF2						PTRO	SAVE ADJACENT TO S1		PP050120	
3041	1162	OC9F	D7C0						PRN			PP050130	

	PAGE 144
PP050570	
PP050580	
PP050590	AA6 TOO LARGE THEREFORE AAUR = BAUR = C (IF E)
PP050600	
PP050610	
PP050620	AA6 TOO SMALL THEREFORE AAUR = BAUR = O (IF E)
PP050630	
PP050640	AA6 OK R1 = O, I, OR 2 6 CONS FOR EACH LAT
PP050650	DATA ADDRESS FOR THIS LAT
PP050660	A1 PI-2B5
PP050670	*AA6 PIB-1
PP050680	B PI-1B4
PP050690	*AA6
PP050700	C B3
PP050710	SHIFT LEFT 8 AAUR AT B-5
PP050720	
PP050730	DA
PP050740	*AA6
PP050750	DB
PP050760	*AA6
PP050770	DC
PP050780	
PP050790	SHIFT LEFT 9 BAUR AT B-6
PP050800	
PP050810	A5**2 1 B2
PP050820	
PP050830	
PP050840	A2
PP050850	
PP050860	SHIFT RIGHT 1
PP050870	B1 AT B1
PP050880	
PP050890	
PP050900	
PP050910	2B1**2 B1
PP050920	
PP050930	
PP050940	PI/2 AT P1B-1
PP050950	-AA6 = 84 P1B-1
PP050960	
PP050970	B4**2
PP050980	B4**3 = AA6 AT PI+3B-3
PP050990	AA2 AT PI+3B-2

MOD 36 05/13/76 AN/BRN-7

3125 560 0031 6021 2,1 AA4 AT P1
3126 566 0032 6013 1,3 AA3 AT P1+38-2
3127 570 0033 FCB91C80 11, AUR_SAVE
3128 602 0035 7668 16,11 SAVE AA2 ~ AA6, AAUR, BAUR

3129 604 0036 A400 0,13 P1
3130 608 0037 D053 (0038) \$83 SOUTHERN HEMISPHERE
3131 8R 0038 F48A1C9F 11, SEASON_INDEX_NORTH
3132 12 003A D002 (003D) \$84
3133 8R 003B F48A1CA0 \$83
3134 2R 003D 9C10 \$84 11, SEASON_INDEX_SOUTH
3135 10 # 003E F80D1688 1,0
3136 18 0040 8410 BSV LATITUDE
3137 30 0041 C9F2 FETM
3138 32 0042 A421 FETD
3139 570 0043 1800 CLA
3140 574 0044 F4294000 ATAN
3141 580 0046 F0240024 ADDM
3142 584 0048 F0C90E39 MPYM
3143 592 004A 5263 (00E3) SUBLM
3144 6R 004B F0C40048 MPYM
3145 8 004D 9827 COMM
3146 12 004E D022 (0051) RGE
3147 6R 004F F0C44000 RSA
3148 10R 0051 F12C1922 FET
3149 12 0053 A420 CLA
3150 20 0054 D700 PRN
3151 22 0055 9C33 CLAM
3152 24 0056 A423 CLA

3153 2R 0057 9C40 *
3154 12 0058 F42C0D5C \$32
3155 6R 005A A651
3156 8 005B 9411
3157 6R 005C FC440010 \$35
3158 8 005E 984F
3159 12 005F D019 (0069)
3160 2R 0060 9C40
3161 12 0061 F42C0D65
3162 6R 0063 A651
3163 8 0064 9411

DETERMINE CONDUCTIVITY LEVEL

2,1 AA4 AT P1
1,3 AA3 AT P1+38-2
11, AUR_SAVE
16,11 SAVE AA2 ~ AA6, AAUR, BAUR

0,13 P1
\$83 SOUTHERN HEMISPHERE
\$84 11, SEASON_INDEX_NORTH
\$83 11, SEASON_INDEX_SOUTH
\$84 1,0
BSV LATITUDE
FETM
FETD
CLA
ATAN
ADDM
MPYM
SUBLM
MPYM
COMM
RGE
RSA
FET
CLA
PRN
CLAM
CLA

4,10
2,1 \$35
15,1
1,1
4,16
4,15
\$36
4,10
2,1 \$37
15,1
1,1

CLEAR WORD FOR DOUBLE SHIFT
TEST - TIME FOR NEXT WORD
YES-READ NEXT DATA WORD
AND INCREMENT ADDRESS
PLACE NEXT 4 BITS IN UPPER WORD
IS IT WATER (F)
IF YES FIGURE OUT HOW MANY
GET
NEXT
4 BITS
AND

PP051000
PP051010
PP051020
PP051030
PP051040
PP051050
PP051060
PP051070
PP051080
PP051090
PP051100
PP051110
PP051120
PP051130
PP051140
PP051150
PP051160
PP051170
PP051180
PP051190
PP051200
PP051210
PP051220
PP051230
PP051240
PP051250
PP051260
PP051270
PP051280
PP051290
PP051300
PP051310
PP051320
PP051330
PP051340
PP051350
PP051360
PP051370
PP051380
PP051390
PP051400
PP051410
PP051420

3164	6R	0D65	FC440010	MOD 36	05/18/76	AN/BRN-7	4,,16	DECREMENT LONGITUDE	PAGE 140
3165	8	0D67	8C04	\$37		SUB	0,4	COUNT WITH REPEAT CODE	PP051430
3166	10	0D68	9C4F			CLAM	4,,15	CONDUCTIVITY LEVEL FOR WATER	PP051440
3167	2R	0D69	9001	\$36		SUBM	0,,1	DECREMENT LONG COUNT	PP051450
3168	6	0D6A	D924 (0D57)			BGE	\$32	DONE WHEN LONG COUNT NEGATIVE	PP051460
3169	4R	0D6B	4443			MPIM	4,,3	SET LEVEL UP FOR THREE FREQ	PP051470
3170	6	0D6C	A454			CLA	5,,4		PP051480
3171	22	0D6D	D740	*		PRN	4		PP051490
				*					PP051500
				*					PP051510
				*					PP051520
				*					PP051530
									PP051540
									PP051550
3172	32	0D6E	8422			FETM	2,,2	FREQUENCY COUNTER JF	PP051560
3173	6R	0D6F	A5F8	\$50		CLA	X15,8	GET ADDRESS OF RESULTS	PP051570
3174	12	0D70	C001			FET	0,1	JF	PP051580
3175	16	0D71	44C9			MPIM	0,,9	GET ADDRESS FOR THIS FREQUENCY	PP051590
3176	18	0D72	8410			ADD	1,0		PP051600
3177	20	0D73	A40C			CLA	0,12	SEASON INDEX	PP051610
3178	22	0D74	B402			ADD	0,2	FOR THIS FREQ	PP051620
3179	30	0D75	F50A16EE			CLA	X0,,DIURNAL_CONSTANT_TABLE K		PP051630
3180	36	0D77	6C07			MPV	0,7	K*FM2	PP051640
3181	38	0D78	8408			ADD	0,8	F = FM1 + K*FM2 B1	PP051650
3182	46	0D79	C1F8			FET	X15,8	INTEGRATION MARKER NONE ZERO	PP051660
3183	50	0D7A	D114 (0D8F)			BNE	\$41	FIRST TIME THRU	PP051670
3184	6R	0D7B	A522			CLA	X2,2	F(OLD)	PP051680
3185	8	0D7C	8001			SUB	0,1	F(OLD) - F B1	PP051690
3186	12	0D7D	4408			LSA	0,,3	B-2	PP051700
3187	18	0D7E	6000			MPV	0,0		PP051710
3188	24	0D7F	C000			FET	0,0		PP051720
3189	30	0D80	F004Q888			MPYM	0,,F(((6.70)/2)/3.1415984) K11		PP051730
3190	38	0D82	6131			MPV	X3,1	TIMES C21	PP051740
3191	44	0D83	8530			ADD	X3,0	+ C11	PP051750
3192	52	0D84	7530			PTR	X3,0	C11 2PI B1	051760
3193	58	0D85	F004QFEA			MPYM	0,,F(((25.0)/2)/3.1415985) K21	F	PP051770
3194	64	0D87	C001			FET	0,1		PP051780
3195	74	0D88	F14516AF			MPV	X4,,ALPHA_0		051790
3196	76	0D8A	8400			ADD	0,0	ALPHA * F 60	PP051800
3197	84	0D8B	6131			MPV	X3,1	C21*ALPHA*F 2PI B1	PP051810
3198	86	0D8C	8410			ADD	1,0	C21	PP051820
3199	94	0D8D	D700			PRN	0		PP051830
3200	98	0D8E	D005 (0D94)			BUC	\$42		PP051840
3201	2R	0D8F	A401	\$41		CLA	0,1	F AT B1	PP051850
3202	12	0D90	F13616AF			MPV	X3,,ALPHA_0		

3203	18	0092	F004145F	MOD 36	05/18/76	AN/BRN-7	MPYM	0,,F((11)/21/3.14159) C21(1) 2PI 81	PAGE 14
3204	8R	0094	7521	542			PTR	X2,1	PP051860
3205	16	0095	7112				STA	C21 2PI 81	PP051870
3206	24	0096	C010				FET	SAVE F FOR F(OLD)	PP051880
3207	34	0097	F8040040					F	PP051890
3208	42	0099	8D33				RSAD	DOUBLE F AT B10	PP051900
3209	54	009A	7D33				ADDD	GG 810	PP051910
3210	60	009B	C002				PTRD		PP051920
3211	72	009C	C565				FET	JF	PP051930
3212	76	009D	4425				FETD	BAUR, AAUR	PP051940
3213	86	009E	8424				MPIM		PP051950
3214	8R	009F	F51A0E7C				FETM		PP051960
3215	16	00A1	6318	574			CLA	X1,,CAY_TABLE	PP051970
3216	18	00A2	8430				MPY	IX1,11	PP051980
3217	26	00A3	F55A0E81				ADD	*AA(I)	PP051990
3218	34	00A5	6318				CLA	AAUR + SUM CAY(I)*AA(I) B-5	PP052000
3219	36	00A6	8440				MPY	*AA(I)	PP052010
3220	38	00A7	9451				ADDH	BAUR + SUM DCAY(IC,I)*AA(I) B-6	PP052020
3221	46	00A8	C41A (009F)				BXU		PP052030
3222	2R	00A9	A458				CLA	JF	PP052040
3223	4	00AA	845A				ADD	+IC	PP052050
3224	12	00AB	F55A0E47				CLA	X5,,CAY1_TABLE B-5	PP052060
3225	14	00AD	B403				ADD		PP052070
3226	24	00AE	F186171F				MPY	X8,,RAT_TABLE FREQ CON B1	PP052080
3227	26	00B0	A430				CLA	A(JF) B-4	PP052090
3228	34	00B1	F55A0110				CLA	X5,,OCAY1_TABLE B-6	PP052100
3229	36	00B3	8404				ADD		PP052110
3230	46	00B4	F186171F				MPY	X8,,RAT_TABLE	PP052120
3231	48	00B6	A440				CLA	B(JF) B-5	PP052130
3232	60	00B7	0720				PRN		PP052140
3233	62	00B8	A421				CLA	8 AT B-5	PP052150
3234	68	00B9	6013				MPY	8*F	PP052160
3235	70	00BA	8401				ADD	DELTA THETA 3 AT B-4	PP052170
3236	80	00BB	4802				RSAD	810	PP052180
3237	88	00BC	8D47				ADDD	THETA 3 B10	PP052190
3238	100	00B0	7D47				PTRD		PP052200
3239	106	00BE	A5F1				CLA	X15,1	PP052210
3240	112	00BF	6000				MPY	PI	PP052220
3241	122	00C0	F0060E77				MPY	PI**2 B2	PP052230
3242	132	00C2	F8040040				RSAD	DELTA THETA 2 B-4	PP052240
3243	140	00C4	8D25				ADDD	85	PP052250
3244	152	00C5	7D25				PTRD	THETA 2 AT B10	PP052260
3245	162	00C6	F41C0D6F				BXU	FREQUENCY INDEX	PP052270
								1,,50	PP052280

3246	22R	MOD 36	05/18/76	AN/BRN-7	PRN	7	13,13	TEST FOR END OF INTEGRATION	INTEGRATION MARKER EQUAL ZERO	PAGE 148
3247	24	*			SUB					PP052290
		*								PP052300
		*								PP052310
3248	36			00C8 0770	FETD		0, INTEGRATION_COUNTER			PP052320
3249	46			00C8 F8081AC8	SUBD		0, DF(1.01)/3.14159265)			PP052330
3250	58			00CD 7C0D (008D)	MPY		0, INTEGRATION_COUNTER			PP052340
3251	62			00CE 014C (00E8)	MPY		360 DONE			PP052350
3252	18R			00CF C069	FET		6,11 GET AX AND P + 1 REGISTER			PP052360
3253	20			00D0 A465	CLA		6,5 AX CROSS P			PP052370
3254	26			00D1 6061	MPY		6,1			PP052380
3255	32			00D2 6013	MPY		1,3			PP052390
3256	38			00D3 6032	MPY		3,2			PP052400
3257	44			00D4 6024	MPY		2,4			PP052410
3258	50			00D5 6040	MPY		4,0			PP052420
3259	56			00D6 6005	MPY		0,5			PP052430
3260	58			00D7 8062	SUB		6,2			PP052440
3261	60			00D8 8030	SUB		3,0			PP052450
3262	62			00D9 8041	SUB		4,1			PP052460
3263	66			00DA FC29028F	CLAM		2, F(1.0181) SIN(DTHETA) B-1			PP052470
3264	72			00DC 6032	MPY		3,2			PP052480
3265	78			00DD 6042	MPY		4,2			PP052490
3266	84			00DE 6062	MPY		6,2			PP052500
3267	96			00DF 0720	PRN		2			PP052510
3268	100			00E0 FC297FFE	CLAM		2, F(1.99995) COS DTHETA B0			PP052520
3269	106			00E2 6092	MPY		9,2			PP052530
3270	112			00E3 60A2	MPY		10,2			PP052540
3271	118			00E4 60B2	MPY		11,2			PP052550
3272	120			00E5 8493	ADD		9,3			PP052560
3273	122			00E6 84A0	ADD		10,0			PP052570
3274	124			00E7 8431	ADD		11,1			PP052580
3275	138			00E8 D730	PRN		3			PP052590
3276	144			00E9 0400CDD0	BUC		\$55			PP052600
		*								PP052610
		*								PP052620
		*								PP052630
		*								PP052640
		\$60								PP052650
3277	28R			00E8 D7A0	PRN		10			PP052660
3278	30			00EC A424	CLA		2,4			PP052670
3279	34			00ED 4423	MPIM		2,3			PP052680
3280	48			00EE C041	FET		4,1			PP052690
3281	58			00EF F83B008D	SUBD		3, INTEGRATION_COUNTER			PP052700
3282	184			00F1 DC13	DIVD		1,3 AVERAGING CONSTANT AT B+0			PP052710

3283	192	00F2	867D	(00F0)	MOD 36	05/18/76	AN/BRN-7	0,,RIJ_ADD	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3284	200	00F3	864C	(00CC)			FET	0,,RIJ_ADD	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3285	208	00F4	F8000862				FET	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3286	212	00F6	AC50				BSV	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3287	222	00F7	D710				CLAD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3288	230	00F8	8414				PRN	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3289	6R	00F9	C00A				FETM	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3290	12	00FA	C001				FET	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3291	16	00FB	4409				FET	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3292	22	00FC	F0044000				MPIM	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3293	24	00FE	9410				RSA	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3294	26	00FF	A401				CLA	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3295	28	0E00	9405				ADDM	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3296	36	0E01	8412				FETM	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3297	12R	0E02	C802				FETM	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3298	28	0E03	6809				MPYD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3299	40	0E04	7F24				PTRD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3300	48	0E05	CC04	(0E02)			BXUD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3301	12R	0E06	D720				PRN	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3302	26	0E07	F91C176F				FETO	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3303	44	0E09	6923				MPYD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3304	170	0E0A	DC0A				DIVD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3305	180	0E08	FD381795				ADDD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3306	188	0E0D	8D27				ADDD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3307	6R	0E0E	FC040020				LSAD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3308	16	0E10	F1C71C89				STA	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3309	24	0E12	AD20				CLAD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3310	26	0E13	8401				ADD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3311	30	0E14	F409028F				ADDM	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3312	36	0E16	6000				MPY	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3313	46	0E17	F1C71CA1				STA	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3314	50	0E19	AC0A				CLAD	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3315	52	0E1A	94C1				ADDM	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3316	60	0E1B	C013				FET	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3317	66	0E1C	A5F2				CLA	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3318	76	0E1D	F00C1C68				FET	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3319	86	0E1F	F5171D0F				PTR	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3320	94	0E21	F8000847				BSV	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3321	98	0E23	D007	(0E28)			BCF	0,,BASE+1	0,,BASE+1	"COMPUTE THETA1 FOR THE	052720
3322	102	0E25	8000				BS				

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"SET UP ARGUMENTS FOR THETAC BASE PP053150
"(THETA 1), FREQ, BASE STA NO) PP053160
THETA 1 BASE PP053170
FREQ PP053180
PP053190
"COMPUTE THETA C FOR THE
" BASE STATION PP053200
"THETA P = THETA C - THETA C BASE PP053210
PP053220
"THETA P = PREDICTED TRACKING
PP053240
" FILTER MEASUREMENT
PP053250
" (FRACTIONS OF A CYCLE
PP053260
" + THE TOTAL INTEGER
PP053270
" LANE COUNT)
PP053280
PP053290
PP053300
PP053310
PP053320
PP053330
"CORRECT PREDICTED PHASE FOR
PP053340
" T ZERO TERM
PP053350
"THETA P = THETA C + T(0)
PP053360
STA NO
PP053370
"COMPUTE POINTER TO THE TRACKING
PP053380
"FILTER PHASE ESTIMATE P
PP053390
FREQ
PP053400
X0, PHI_ESTIMATE "UPDATE LANE COUNT"
PP053410
0, 4
PP053420
PP053430
"REPLACE THE INTEGER PART OF P
PP053440
"(IN CYCLES) WITH THE INTEGER
PP053450
"PART OF THETA P. ADJUST THE
PP053460
X2, PHI_ESTIMATE "LANE COUNT IN P BY 1 IF NECES-PP053470
PP053480
" SARY SO THAT THETA P AND P ARE
PP053490
" WITHIN 1/2 CYCLE OF EACH OTHER
PP053500
"ARE THERE MORE
PP053510
"PROPAGATION_PREDICTION$61 "FREQ TO PROG?"
PP053520
"EXIT"
PP053530
"THE ARGUMENT IS UNDISTURBED
PP053540
"45 WORDS HAVE BEEN ADDED TO THE
PP053550
"R 15 PUSH DOWNSTACK
PP053560
PP053570

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3343	OE41	008FFFFF6	FREQ_TABLE	CQND	F((441.176D-6)*10.2000D38-10)	PP053580
3344	OE43	008FFFFF3		CQND	F((441.176D-6)*13.6000D38-10)	PP053590
3345	OE45	009FFFFD6		CQND	F((441.176D-6)*11.3333D38-10)	PP053600
						PP053610
						PP053620
						PP053630
						PP053640
3346	OE47	E810	CAYL_TABLE	CQND	F((1-27.0D-6)*.9974)*217.02185)	10.2PP053650
3347	OE48	DC89		CQND	F((1-40.0D-6)*.9974)*217.02185)	13.6PP053660
3348	OE49	E3A1		CQND	F((1-32.0D-6)*.9974)*217.02185)	11.3PP053670
3349	OE4A	EE45		CQND	F((1-20.0D-6)*.9974)*217.02185)	PP053680
3350	OE4B	EOF8		CQND	F((1-35.0D-6)*.9974)*217.02185)	PP053690
3351	OE4C	E810		CQND	F((1-27.0D-6)*.9974)*217.02185)	PP053700
3352	OE4D	Q7F8		CQND	F((1+09.0D-6)*.9974)*217.02185)	PP053710
3353	OE4E	E85C		CQND	F((1-23.0D-6)*.9974)*217.02185)	PP053720
3354	OE4F	F8E8		CQND	F((1-08.0D-6)*.9974)*217.02185)	PP053730
3355	OE50	1D42		CQND	F((1+33.0D-6)*.9974)*217.02185)	PP053740
3356	OE51	1862		CQND	F((1+27.5D-6)*.9974)*217.02185)	PP053750
3357	OE52	202F		CQND	F((1+36.3D-6)*.9974)*217.02185)	PP053760
3358	OE53	15CF		CQND	F((1+24.6D-6)*.9974)*217.02185)	PP053770
3359	OE54	2703		CQND	F((1+44.0D-6)*.9974)*217.02185)	PP053780
3360	OE55	1CFE		CQND	F((1+32.7D-6)*.9974)*217.02185)	PP053790
3361	OE56	OE74		CQND	F((1+16.3D-6)*.9974)*217.02185)	PP053800
3362	OE57	2222		CQND	F((1+38.5D-6)*.9974)*217.02185)	PP053810
3363	OE58	166E		CQND	F((1+25.3D-6)*.9974)*217.02185)	PP053820
3364	OE59	Q7Q1		CQND	F((1+07.9D-6)*.9974)*217.02185)	PP053830
3365	OE5A	106F		CQND	F((1+33.2D-6)*.9974)*217.02185)	PP053840
3366	OE5B	10EF		CQND	F((1+19.1D-6)*.9974)*217.02185)	PP053850
3367	OE5C	Q2D6		CQND	F((1+03.2D-6)*.9974)*217.02185)	PP053860
3368	OE5D	1A99		CQND	F((1+30.0D-6)*.9974)*217.02185)	PP053870
3369	OE5E	QD1F		CQND	F((1+14.8D-6)*.9974)*217.02185)	PP053880
3370	OE5F	FFD3		CQND	F((1-00.2D-6)*.9974)*217.02185)	PP053890
3371	OE60	1878		CQND	F((1+27.6D-6)*.9974)*217.02185)	PP053900
3372	OE61	QAA4		CQND	F((1+12.0D-6)*.9974)*217.02185)	PP053910
3373	OE62	FD57		CQND	F((1-03.0D-6)*.9974)*217.02185)	PP053920
3374	OE63	1682		CQND	F((1+25.6D-6)*.9974)*217.02185)	PP053930
3375	OE64	0828		CQND	F((1+09.2D-6)*.9974)*217.02185)	PP053940
3376	OE65	F87A		CQND	F((1-05.1D-6)*.9974)*217.02185)	PP053950
3377	OE66	151A		CQND	F((1+23.8D-6)*.9974)*217.02185)	PP053960
3378	OE67	Q6A6		CQND	F((1+07.5D-6)*.9974)*217.02185)	PP053970
3379	OE68	FA53		CQND	F((1-06.4D-6)*.9974)*217.02185)	PP053980
3380	OE69	144E		CQND	F((1+22.9D-6)*.9974)*217.02185)	PP053990
3381	OE6A	057F		CQND	F((1+06.2D-6)*.9974)*217.02185)	PP054000

3382	OE68 F99E	CON	F(((+22.20-6)*.9974)*217.02185)	PP054010
3383	OE6C 13AF	CON	F(((+22.20-6)*.9974)*217.02185)	PP054020
3384	OE6D 049C	CON	F(((+22.20-6)*.9974)*217.02185)	PP054030
3385	OE6E F8E8	CON	F(((+22.20-6)*.9974)*217.02185)	PP054040
3386	OE6F 1310	CON	F(((+21.50-6)*.9974)*217.02185)	PP054050
3387	OE70 03FD	CON	F(((+21.50-6)*.9974)*217.02185)	PP054060
3388	OE71 F833	CON	F(((+21.50-6)*.9974)*217.02185)	PP054070
3389	OE72 129E	CON	F(((+21.50-6)*.9974)*217.02185)	PP054080
3390	OE73 035E	CON	F(((+21.50-6)*.9974)*217.02185)	PP054090
3391	OE74 F805	CON	F(((+21.50-6)*.9974)*217.02185)	PP054100
3392	OE75 1271	CON	F(((+20.80-6)*.9974)*217.02185)	PP054110
3393	OE76 0375	CON	F(((+20.80-6)*.9974)*217.02185)	PP054120
			F(((+20.80-6)*.9974)*217.02185)	PP054130
			F(((+20.80-6)*.9974)*217.02185)	PP054140
3394	OE77 BC5F	CON	F(((((-.3360-4)*.9974)*217.0218+6)*4)/3) 13.6	054150
				PP054160
3395	OE78 53E9	CON	F(((1.02974)/3-.141592658-1) P18-1	PP054170
3396	OE79 0889	CON	F(((1.02974)/3-.141592658-1) P18-1	PP054180
3397	OE7A 0222	CON	F(((1.02974)/3-.141592658-1) P18-1	PP054190
3398	OE7B 149F	CON	F(((1.02974)/3-.141592658-1) P18-1	PP054200
				PP054210
				PP054220
3399	OE7C FD40	CON	F(((((-0.40-6)*217.0211)*.9974)*31.00628+3) P1-38-PP054230	PP054230
3400	OE7D 0000	CON		PP054240
3401	OE7E FE31	CON	F(((((-.650-6)*217.0211)*.9974)*3.141598+5) P1-18-PP054250	PP054250
3402	OE7F 0000	CON		PP054260
3403	OE80 Q107	CON	F((((1.320-6)*217.0211)*.9974)*3.141598+4) P1-18-PP054270	PP054270
				PP054280
				PP054290
				PP054300
				PP054310
				PP054320
3404	OE81 267D	CON	F((((+2.80)*217.0211)*.9974)*31.00628+40-6) 10.2PP054330	10.2PP054330
3405	OE82 EB62	CON	F((((+2.80)*217.0211)*.9974)*31.00628+40-6) 10.2PP054340	10.2PP054340
3406	OE83 039F	CON	F((((+0.65)*217.0211)*.9974)*3.141598+60-6) 10.2PP054350	10.2PP054350
3407	OE84 204D	CON	F((((+4.70)*217.0211)*.9974)*31.00628+30-6) 10.2PP054360	10.2PP054360
3408	OE85 FC53	CON	F((((+1.32)*217.0211)*.9974)*3.141598+50-6) 10.2PP054370	10.2PP054370
3409	OE86 1904	CON	F((((+1.82)*217.0211)*.9974)*31.00628+40-6) 13.6PP054380	13.6PP054380
3410	OE87 EC58	CON	F((((+1.43)*217.0211)*.9974)*31.00628+40-6) 13.6PP054390	13.6PP054390
3411	OE88 039F	CON	F((((+0.65)*217.0211)*.9974)*3.141598+60-6) 13.6PP054400	13.6PP054400
3412	OE89 1AAA	CON	F((((+3.88)*217.0211)*.9974)*31.00628+30-6) 13.6PP054410	13.6PP054410
3413	OE8A FC53	CON	F((((+1.32)*217.0211)*.9974)*3.141598+50-6) 13.6PP054420	13.6PP054420
3414	OE8B 2070	CON	F((((+2.36)*217.0211)*.9974)*31.00628+40-6) 11.3PP054430	11.3PP054430

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3415	OE8C EC35	CON	F(((1.44)*217.021)*.9974)*31.00628+40-6)	11.3PP054440
3416	OE8D 039F	CON	F(((+0.65)*217.021)*.9974)*3.141598+60-6)	11.3PP054450
3417	OE8E 1D01	CON	F(((+4.22)*217.021)*.9974)*31.00628+30-6)	11.3PP054460
3418	OE8F FC53	CON	F(((1.32)*217.021)*.9974)*3.141598+50-6)	11.3PP054470
				PP054480
				PP054490
3419	OE90 02A6	CON	F(((00310.04)*9.869598-5)*.9974)*217.0210-6)	PP054500
3420	OE91 FC83	CON	F(((1.0641.39)*3.141598-4)*.9974)*217.0210-6)	PP054510
3421	OE92 0126	CON	F(((00331.718-3)*.9974)*217.0210-6)	PP054520
3422	OE93 07F3	CON	F(((00930.131)*9.869598-5)*.9974)*217.0210-6)	PP054530
3423	OE94 F5A3	CON	F(((1.1905.09)*3.141598-4)*.9974)*217.0210-6)	PP054540
3424	OE95 0361	CON	F(((00975.478-3)*.9974)*217.0210-6)	PP054550
3425	OE96 F092	CON	F(((1.1805.55)*9.869598-5)*.9974)*217.0210-6)	PP054560
3426	OE97 168D	CON	F(((04179.73)*3.141598-4)*.9974)*217.0210-6)	PP054570
3427	OE98 F7A3	CON	F(((1.2414.908-3)*.9974)*217.0210-6)	PP054580
3428	OE99 0395	CON	F(((1.5197.77)*9.869598-5)*.9974)*217.0210-6)	PP054590
3429	OE9A 406A	CON	F(((1.11840.17)*3.141598-4)*.9974)*217.0210-6)	PP054600
3430	OE9B E880	CON	F(((1.6731.368-3)*.9974)*217.0210-6)	PP054610
3431	OE9C 0084	CON	F(((00060.30)*9.869598-5)*.9974)*217.0210-6)	PP054620
3432	OE9D FF11	CON	F(((1.0171.32)*3.141598-4)*.9974)*217.0210-6)	PP054630
3433	OE9E 006C	CON	F(((00121.658-3)*.9974)*217.0210-6)	PP054640
3434	OE9F FF33	CON	F(((1.0093.80)*9.869598-5)*.9974)*217.0210-6)	PP054650
3435	OEAO 011F	CON	F(((00206.28)*3.141598-4)*.9974)*217.0210-6)	PP054660
3436	OEAL FFA4	CON	F(((1.0104.138-3)*.9974)*217.0210-6)	PP054670
			* PROGRAMMER CONTROLLER ROUTINE DISPLAYS 2 HEX DIGITS FOR TEST RESULTS	
			* IN ITS LED AND OPERATES GO - NOGO - LIGHTS.	
			* ALSO SEE THE IOC X(8C00) IN THE SYNC ROUTINE.	
3437	OE2 F80F8C80	IOC	0,X(8C80)	054690
3438	OE4 F80C002E	FETD	0,,TEST_FAIL_TEMP GET FAIL WORDS	054700
3439	OE6 C001	FET	0,1 SWAP WORDS	054710
3440	OE7 F42A000D	CLA	2,,HX0100 GIVES ZERO IF NO ERROR	054720
3441	OE9 DD02	NMLD	0,2 REG 2 GETS -(SHIFT COUNT)	054730
3442	OEAA F0271EE8	STA	2,,AVIONICS SAVE SHIFT COUNT FOR PC OUTP	054750
3443	OEAC 0062 (OEAF)	BRE	\$1 TURN ON NOGO	054760
3444	OEAD F80F8C00	IOC	0,,X(8C00) OUTPUT 2 HEX DIGITS TO PC	054770
3445	OEAF FC0D1EE8	PCP	\$1 0,,AVIONICS RETURN	054780
3446	OE81 D540	B8K	4	054790
				054800

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 DP054810
 *H054820
 *H054830
 *H054840
 *H054850
 *H054860
 *H054870
 *H054880
 *H054890
 *2054900
 DP054910
 DP054920
 *2054930
 DP054940
 DP054950
 DP054960
 DP054970
 DP054980
 DP054990
 DP055000
 DP055010
 DP055020
 DP055030
 DP055040
 DP055050
 DP055060
 DP055070
 *2055080
 DP055100
 *H055110
 *H055120
 *H055130
 *H055140
 *H055150
 DP055160
 DP055170
 DP055180
 DP055190
 DP055200
 *H055210
 DP055220
 DP055230

PANEL MAIN

THIS ROUTINE PROCESSES ALL DATA INSERTED THROUGH THE CONTROL INDICATOR
 * PANEL AND GENERATES ALL DATA DISPLAYED ON THE PANEL. IT IS A NON
 * CMEGA TASK THAT IS EXECUTED 10 TIMES A SECOND.

3447	8R	0EB2 D700	PRN	0	PRUNE ONE EXEC REGISTER
3448	16	0EB3 F40A1F47	CLA	0,,PANELMODE	"READ PANEL MODE
3449	22	0EB5 04051027	BRL	PANEL_TEST	"IS THE PANEL IN THE TEST MODE? "(MODE NEGATIVE)
3450	4R	0EB7 D162 (OECA)	BRE	\$11	"IS THE PANEL QUIESCENT?" "(MODE ZERO)
3451	18R	0EB8 F02C1F40	FET	2,,CALLWORD	"READ PANEL PARAMETERS "CALL = NUMBER DEFINING MAJOR " PANEL SUBROUTINE BASED ONDP054990 " LOWER KEYBOARD BUTTONS "ARG1, ARG2 = " TEMPORARY STORAGE " USED BY VARIOUS " ROUTINES TO SAVE " INFORMATION DURING " BUTTON PUSHING " PROCEDURES " TEST MODE AGAIN
3452	20	0E8A 9831	COMM	3,,1	"
3453	26	0EBB 04061248	BRE	PANELOUTPUT	"IS THE PANEL IN THE DISPLAY MODEDP055090 "(MODE = 1)
3454	22R	0EBD F03C0005	FET	3,,C_L_RIGHT_DISPLAY AND BOTH LEGENDS "READ THE LEFT LEGEND, RIGHT "LEGEND AND THE LEFT DISPLAY "REGISTER (DISPLAY IS A 6 DIGIT "BCD WORD) "CONVERT DISPLAY TO INTEGER IN "UNITS OF LSB OF THE DISPLAY "1,,C_L_LEFT_DISPLAY "READ RIGHT DISPLAY REGISTERDP055230	
3455	30 *	0EBF F80D1564	BSV	BCD0B0B	"
3456	44	0EC1 F01C0003	FET	1,,C_L_LEFT_DISPLAY	"

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3457	52 *	QEC3 F80D1564	BSV	BCDT0BIN	PROCESSING COMMON TO ALL INSERT	0 = POS	"CONVERT DISPLAY TO INTEGER IN
3458	64 *	QEC5 FB6DQEDD	BSV	IX6,, \$1	THE INSERT PROCESSING IS NOW	"UNITS OF LBS OF THE DISPLAY	*1055240
3459	66	QEC7 9C00	CLAM	0,,0	COMPLETE	"RESET PANEL MODE TO QUIESCENT	*1055250
3460	76	QEC8 F001F47	STA	0,,0, PANELMODE	"	" (MODE = 0)	*1055260
3461	6R	QEC9 8400	FETM	0,,0	RETURN HERE IF DISPLAY MODE	"SET UP TO TURN ALL STATUS	*1055270
3462	8R	QECB F41A0084	CLA	1,,N	AFTER GENERATING DISPLAY	"LAMPS OFF	*1055280
3463	12	QECD D061 (0ECF)	BRE	\$14	"	"DOES KALMAN HAVE	*1055290
3464	6R	QECE 9658 (00D9)	ADD	0,,HX0040	"	" MORE THAN ONE STATE VECTOR?	*1055300
3465	6R	QECF 961F (009F)	ADD	0,,C_I_STATUS_	"TURN ON THE OMEGA AMBIGUITY LAMP	"	*1055310
3466	14	QED0 F41A00CA	CLA	1,,MODE	"	"CONTROL STATE OF SYNC AND	*1055320
3467	16	QED2 DE62	FLG	C+E	"	"SIGNAL LOSS LAMPS AS INDICATED	*1055330
3468	38	QED3 F82C1F96	FETD	2,,SAVE_POSITION_VARIANCES	"	"BY THE SYNCHRONIZATION AND	*1055340
3469	42	QED5 8C02	ADDD	0,,2	"	"TRACKING FILTER ROUTINES	*1055350
3470	46	QED6 D0C5 (0EDC)	BCT	\$69	"	"TRUE = PHASE DIFF	*1055360
3471	10R	QED7 FC2A1D3F	CLAD	2,,P33	"	"FALSE = RMO RHO	*1055370
3472	30	QED9 F8261AB0	MPYD	2,,=DF(72*6076*6076/2.095/2.095D14B-8)	"	"	*1055380
3473	34	QED8 8C02	ADDD	0,,2	"	"	*1055390
3474	10R	QEDC F8081AB2	CCMD	0,,=DF(4*6076*6076/2.095D7B-8)	"	"	*1055400
3475	24	QEDE D730	PRN	3	"	"	*1055410
3476	28	QEDF D051 (0EE1)	BRL	\$36	"	"	*1055420
3477	6R	QEE0 9659 (00D9)	ADD	0,,HX0010	"	"	*1055430
3478	2R	QEE1 9408	ADDM	0,,8	"	"	*1055440
					"	"	*1055450
					"	"	*1055460
					"	"	*1055470
					"	"	*1055480
					"	"	*1055490
					"	"	*1055500
					"	"	*1055510
					"	"	*1055520
					"	"	*1055530
					"	"	*1055540
					"	"	*1055550
					"	"	*1055560
					"	"	*1055570
					"	"	*1055580
					"	"	*1055590
					"	"	*1055600
					"	"	*1055610
					"	"	*1055620
					"	"	*1055630
					"	"	*1055640
					"	"	*1055650
					"	"	*1055660

	MOD	36	05/18/76	AN/BRN-7	PAGE 150
3479	I2	0EE2 F00C1F8C	FET	0,, FLOATER	"MUSE MARKER DP055670
3480	20	0EE4 D700	PRN	0	"IS THE LOOP DP055680
3481	24	0EE5 0012 (0EE8)	PNE	\$35	"ANTENNA IN USE? \$R055690
3482	4R	0EE6 F4090018	ADDM	0,, X(0018)	"TURN OFF THE FLOATER LAMP AND DP055700
		*			"TURN ON THE LOOP ANTENNA IN USE DP055710
		*			"LAMP DP055720
3483	4R	0EE8 FC1920F8	CLAM	1,X(20F8)	"MASK FOR STATUS LAMP 055730
3484	16	0EEA E0010009	MRC	0,1,C,I_OUTPUT_	"MALFUNCTION_STATUS_INDICATORS 055740
		*			"OUTPUT THE STATE OF THE STATUS DP055750
		*			"LAMPS TO THE C/I DP055760
3485	30	0EEC D510	B8K	1	"EXIT PANEL ROUTINE" \$S055770
		*			C1055780
3486		0EED OEFA	CCN	\$5	INPUTS DP055790
3487		0EEE OF09	CON	\$12	1 SPARE DP055800
3488		0EEF OF09	CON	\$12	SPARE 055810
3489		0EF0 Q000	CON	0	SIGMA - SPARE DP055820
3490		0EF1 OF09	CON	\$12	4 SPARE DP055830
3491		0EF2 OF0A	CON	\$3	D-GMT 055840
3492		0EF3 OF09	CON	\$12	6 SPARE DP055850
3493		0EF4 OF09	CON	\$12	DP055860
3494		0EF5 OF64	CGN	\$4	MAN H/S 055870
3495		0EF6 OF09	CON	\$12	SPARE 055880
3496		0EF7 OF09	CON	\$12	SPARE 055890
3497		0EF8 OF7A	CON	\$7	POS 055900
3498		0EF9 OF09	CON	\$12	SPARE 055910

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DP055920	
#H055930	
#H055940	
#H055950	
#H055960	
#H055970	
#H055980	
#H055990	
#H056000	
056010	
056020	
056030	
056040	
056050	
056060	
3 056070	
DP056080	
DP056090	
#I056100	
DP056110	
DP056120	
DP056130	
DP056140	
DP056150	

MOD	35	05/18/76	AN/BRN-7	CLAD	2, C, I, RIGHT_DISPLAY BCD TIME	PAGE 159
3541	40	OF38	FC2A0005	BSV	MAKE_TWO_BINARY HOURS (0 TO 23)	DP056590
3542	48	OF3A	F80D100F	CLAD	6,4	DP056600
3543	52	OF3C	AC64	MPIM	7,5,60	DP056610
3544	56	OF3D	F474C03C	BSV	CONVERT TO MINUTES	DP056620
3545	64	OF3F	F80D100F	ADD	MINUTES (0 TO 59)	DP056630
3546	66	OF41	B475	MPIDM	6,5,60	DP056640
3547	72	OF42	FC64003C	BSV	CONVERT TO SECONDS	DP056650
3548	80	OF44	F80D100F	ADD	SECONDS (0 TO 59)	DP056660
3549	84	OF46	BC64	MPIDM	6,4	DP056670
3550	90	OF47	FC6400C8	STAD	CONVERT TO UNITS OF 5 MILLISECONDS	DP056680
3551	102	OF49	F86700C6	SUBD	SAVE NEW GMT	DP056690
3552	112	OF48	F86B008C	MPYD	6,5,TIME	DP056700
3553	132	OF4D	F86600E7	LSA	6,5,=0F(((50-3831)/24)/(3600)/1B11)	056710
3554	136	OF4F	F4840010	ADD	8,4	056720
3555	138	CF51	B468	STAD	6,8	DP056730
3556	150	OF52	F86700C4	CLAD	6,5,DAY_SINCE_JAN1_1972	056740
3557	158	OF54	F41AC0E2	EXT	1,1,HX2000	056750
3558	166	OF56	E4110009	BNE	1,1,C,I_OUTPUT_MALFUNCTION_STATUS_INDICATORS	056760
3559	170	OF58	D012 (OF5B)	BSV	\$33	056770
3560	8R	OF59	F80D1613	CLAD	CALC_TIME_CORRECTION CORRECT TIME	056780
3561	8R	OF5B	F41AC0E3	EXT	1,1,HX4000 "READ CURRENT STATE OF ENTER TIME	056790
3562	16	OF5D	E4010009	LSA	0,1,C,I_OUTPUT_LAMPS_MISCELLANEOUS_SWITCHES	DP056800
3563	20	OF5F	4402	ADD	"LAMP. IF IT IS ON TURN IT OFF	056810
3564	22	OF60	B410	MRG	"AND TURN THE ENTER POSITION	DP056820
3565	12R	OF61	E0010009	B8K	"LAMP ON	DP056830
3566	40	OF63	D580		0,1,C,I_OUTPUT_LAMPS_MISCELLANEOUS_SWITCHES	DP056840
					"OUTPUT NEW STATE OF ENTER TIME	DP056850
					"AND / OR ENTER POSITION LAMP	DP056860

MOD 36 05/18/76 AN/BRN-7

3567	8R	OF64	COLL	FET	1,1	SWAP	HEADING	PAGE 160
3568	12	OF65	AC24	CLAD	2,4	AND	SPEED	DP056870
3569	16	OF66	AC40	CLAD	4,0			*H056880
3570	26	OF67	D710	PRN	1			056890
3571	28	OF68	587C	COMM	7,12			056900
3572	34	OF69	C406QFE6	BRE	\$9			056910
3573	4R	OF68	FC092F66	CLAM	0, F(.3703)			056920
3574	36	OF6D	D410	DIV	1,0			056930
								056940
								056950
								056960
								056970
								056980
								056990
								057000
								057010
								057020
								057030
								057040
								057050
								057060
								057070
								057080
								057090
								057100

IS THIS RZ VELOCITY
YES
"CONVERT SPEED FROM INTEGER
"NUMBER OF KNOTS TO FEET/SECOND
"SCALED B11
"SUBTRACT 1/16 FT/SEC SO THAT AN
"INSERTED ZERO WILL GIVE A ZERO
"VELOCITY (DIVIDE FORCES THE LSB
"TO A 1)
"SAVE IN V INSERT
GET ZERO IF ZERO ENTERED

3575	38	OF6E	9011	SUBM	1,1			
3576	48	OF6F	F0171FF4	STA	1, V_INSERT			
3577	58	OF71	FC4A1ACA	CLAD	4, =DI(180000)			
3578	62	CF73	8824	SUBD	2,4			
3579	188	OF74	DC24	DIVD	2,4			
3580	192	CF75	F4298000	ADDM	2, X(18000)			
3581	202	OF77	F0271F88	STA	2, PSI_INSERT			
3582	230	CF79	D580	B8K	8			

3606	54	OF98	F0670087	MOD 36	05/18/76	AN/BRN-7	STA	6, COLD_START_MKR	"SET MARKER TO FORCE KALMAN TO	TOO	PAGE 162
3607	124	OF9D	F4F71F69	*			PTR	15, RIJ	"RESTART IF IT HAS STARTED	DP057550	
3608	136	OF9F	F8071F79				STAD	0, R33	"SAVE RIJ MATRIX	DP057560	
3609	142	OFA1	8400				FETM	0, 0	"SET MARKER TO RESET THE	DP057570	
3610	150	OFA2	7400 (0080)				PTR	0, RESET_IF	"TRACKING FILTERS	DP057580	
3611	128	OFA3	86E3 (00E3)	\$19			FETD	0, HX4000	"TURN OFF ENTER POSITION LAMP	DP057590	
3612	18	OFA4	04000F61				BUC	\$43		057600	
										DP057610	

MOD	36	05/18/76	AN/ERN-7	BSV	COS	
3637	44	*				"COMPUTE RADIAL ERROR SQUARED " = (ERR N)**2 + (ERR E)**2
3638	60			MPYD	6,0	
3639	64			ADD	6,6	
3640	68			CLAD	0,4	
3641	72			CLAD	2,6	
3642	88			MPYD	0,0	
3643	104			MPYD	2,2	
3644	108			ADD	0,2	
3645	118			CCMD	0,,=DF(((1.2)*1.2)/180)/180) 72 MILES	
3646	122			BRL	\$74	"DOES THE RADIAL "ERROR EXCEED 72 N MILE?"
3647	22R			PRN	7	"ERROR TOO LARGE"
3648	26			BUC	\$16	"PROCESS THIS INSERT LIKE A FIRST
3649	10R			CLSD	0,,=DF((11/3.141592658+3)	"POSITION INSERT
3650	136			DIVD	4,0	"SCALE ERRORS IN RADIANS AT B-3
3651	262			DIVD	6,0	"SAVE FOR KALMAN
3652	276			PRN	3	"SET POSITION FIX MARKER TO
3653	298			PTR	3,,ERROR_NORTH	"NOTIFY KALMAN
3654	308			STA	1,,PC_INSERT	"SAVE ASSOCIATED VARIANCE
3655	320			PTRD	0,,POSITION_NOISE	
3656	348			BBK	8	
						* ENTER HERE FOR A MOVING DESTINATION
						* POSITION INSERT
						* \$71
3657	8R			FET	1,3	"CONVERT LAT AND LONG FROM .1 MIN TO 0.58300
3658	442			SINCO5	0	LONG
3659	450			FET	1,5	LAT
3660	884			SINCO5	0	
3661	888			ADD	0,0	"COMPUTE MOVING DESTINATION
3662	904			MPYD	6,0	"POSITION VECTOR RZ SCALED B1
3663	920			MPYD	4,0	"RZ1 = SIN (LAT)
3664	930			PRN	1	"RZ2 = COS (LAT) * COS (LONG)
3665	960			PTR	5,,RZ_POS	"RZ3 = COS (LAT) * SIN (LONG)
3666	972			PRN	2	
3667	980			CLA	0,,RZ_ALPHA	
3668	984			BUC	\$91	COMPUTE BETA
						* ENTER HERE FOR A MOVING DESTINATION
						* VELOCITY - HEADING INSERT
						* \$9
3669	4R			CLAM	0,,F(.7406)	"RESCALE VEL FROM INTEGER KNOTS
3670	36			DIV	1,0	"TO FT/SEC AT 812 SAVE IN RZ VEL
3671	38			SUBM	1,,1	GET ZERO IF ZERO ENTERED

MOD	36	05/19/76	AN/BRN-7	CLAC	4,,=DI(180000)	PAGE 165
0FEA	FC4A1ACA	48	3672	CLAC		058480
0FEC	8824	52	3673	SUBD		058490
0FED	DC24	178	3674	DIVD	2,4	058500
0FEE	F4298000	182	3675	ADDD	2,,X18000)	058510
0FF0	A432	184	3676	CLA	3,2	058520
0FF1	F0171FD8	194	3677	STA	1,,RZ_VEL	DP058530
0FF3	D120	206	3678	PRN	2	DP058540
0FF4	F0071FDA	216	3679	STA	0,,RZ_ALPHA	DP058550
0FF6	1400	434R	3680	SINCOS	0	DP058560
0FF7	F05C1FB8	464	3681	FET	5,,RZ_PQS	DP058570
0FF9	C035	476	3682	FET	3,5	DP058580
0FFA	6800	492	3683	MPYD	0,0	DP058590
0FFB	6822	508	3684	MPYD	2,2	DP058600
0FFC	8C02	512	3685	ADDD	0,2	DP058610
0FFD	1000	958	3686	SQRT	0	DP058620
0FFE	684C	974	3687	MPYD	4,12	DP058630
0FFF	9C44	978	3688	ADDD	4,4	DP058640
1000	A824	982	3689	CLSD	2,4	DP058650
1001	6848	998	3690	MPYD	4,8	DP058660
1002	6826	1014	3691	MPYD	2,6	DP058670
1003	688A	1030	3692	MPYD	8,10	DP058680
1004	686A	1046	3693	MPYD	6,10	DP058690
1005	9C28	1050	3694	ADDD	2,8	DP058700
1006	3C46	1054	3695	ADDD	4,6	DP058710
1007	A844	1058	3696	CLSD	4,4	DP058720
1008	DC20	1184	3697	DIVD	2,0	DP058730
1009	DC40	1310	3698	DIVD	4,0	DP058740
100A	680C	1326	3699	MPYD	0,12	DP058750
100B	8C00	1330	3700	ADDD	0,0	DP058760
100C	F4571FBE	1360	3701	PTR	5,,RZ_BETA	DP058770
100E	D5B0	1394	3702	88K	11	*S058780
0F81			3703	PLOT3		DP058790
0F83			3704	PLOT4		DP058800
						DP058810
						DP058820

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DPO58830

BCD TO BINARY

*H058840

*H058850

*H058860

*H058870

*H058880

*H058890

DPO58900

DPO58910

DPO58920

"SHIFT FIRST CHARACTER FROM MSB'S

"TO LSB'S AND EXTRACT 4 BITS

"SHIFT SECOND CHARACTER FROM

"MSB'S TO LSB'S AND EXTRACT 4

"BITS

"

"RESULT = 2ND CHAR + 10 + 1ST CHR

DPO58980

DPO58990

* THIS ROUTINE WILL CONVERT 2 BCD CHARACTERS TO BINARY. THE ARGUMENT
* IS A 32 BIT WORD WITH THE 2 DIGITS IN THE MOST SIGNIFICANT BITS. THE
* ARGUMENT IS SHIFTED LEFT END AROUND ON RETURN

* TWO M. S. DIGITS IN R2,3 WHICH ARE LEFT CYCLED 8 BITS
* ANSWER IN R5 R1 IS USED

MAKE_TWO_BINARY:

LSED

EXT

LSED

EXT

MPIM

ADD

B8K

2,4

1,3, MX000F

2,4

5,3, MX000F

1,10

5,1

15

100F FC250010

1011 E413177D

1013 FC250010

1015 E453177D

1017 441A

1018 8451

1019 D5F0

8R

16

24

32

36

38

46

3705

3706

3707

3708

3709

3710

3711

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DP059000

DP059010

DP059020

DP059030

DP059040

DP059050

DP059060

DP059070

DP059080

DP059090

DP059100

DP059110

DP059120

DP059130

DP059140

DP059150

DP059160

DP059170

LATITUDE / LONGITUDE SCALING

* THIS ROUTINE TAKES LAT AND LONG THAT HAS BEEN CONVERTED TO BINARY AND
* CHANGES IT TO RADIAN SCALED PI AFTER CORRECTING FOR S LAT AND W LONG

* CONVERT R2,3 AND R4,5 TO LATITUDE AND LONGITUDE

LAT_LONG_SCALING:

FETO

DIVO

COMM

BRE

CLSD

COMM

BRE

CLSD

BBK

101A F80C1A00

101C DC20

101D DC40

101E F869A02E

1020 D061 (1022)

1021 A822

1022 F879A025

1024 D061 (1026)

1025 A844

1026 D510

14R

140

266

270

274

4R

4R

8

4R

14R

3712

3713

3714

3715

3716

3717

3718

3719

3720

3721

"DIVIDE LAT / LONG BY THE NUMBER

"OF .1 MINUTES IN PI RADIAN S

"TO SCALE PI RADIAN S

"EXAMINE LEFT DISPLAY LEGEND

"IS THIS A SOUTH LATITUDE?"

"COMPLIMENT THE LATITUDE

"EXAMINE RIGHT DISPLAY LEGEND

"IS THIS A WEST LONGITUDE?"

"COMPLIMENT THE LONGITUDE

"RETURN"

0.1=0108000

2.0

4.0

6.0X(A02E)

\$1

2.2

7.0X(A025)

\$2

4.4

1

\$1

\$2

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PAGE 168
CI059180

PANEL TEST

```
* THIS PART OF THE C/I PROGRAM IS EXECUTED AFTER THE OPERATOR DEPRESSES #H059210
* THE PANEL TEST BUTTON. IT CYCLES ALL OF THE LAMPS AND OI PLAYS ON THE #H059220
* PANEL IN 10 SECONDS. IT ALSO TURNS OFF THE MALFUNCTION LAMP. #H059230
```

3722	1027	F805FFC	PANEL TEST	COMM	0, 1 (-4)	"EXAMINE PANEL MODE	DP059Z50
------	------	---------	------------	------	-----------	---------------------	----------

3723	6	1029 0112 (103C)	BNE	\$3	"IS THIS THE FIRST ENTRY TO TEST?"R059270
			*		"(MODE = -4)
					DP059280

3724	18R *	102A	2EDD	(0000)	FAILD	IO., HK0100	RECEIVED THE SISTER ON THE MALE LAMP	OK BIT TO TURN DP059300
------	-------	------	------	--------	-------	-------------	---	----------------------------

3725	32	102B	F01C0009	FET	1, C_I_OUTPUT_LAMPS_MISCELLANEOUS_SWITCHES	CI059310
------	----	------	----------	-----	--	----------

3726	102D	701E	(009E)	STA
	40			O, IMAGE9
				"SAVE CURRENT STATE OF ALL STATUSDP059320
				"AND MICROLANGUAGES AMODE=EOB
				ENDP059320

* * *

"AND MISCELLANEOUS LAMPS FOR
"REGISTRATION AFTER TEST FINISH
UP059330 UP059330 P0593360

DP059350

```
* * *
SET UP BIT PATTERN TO TURN ON
DP059360
000000
```

	ALL	LAMPS	ON	THE	PANEL
DP059370					
CI059380					
CI059390					
CI059400					
CI059410					
CI059420					
CI059430					
CI059440					
CI059450					
CI059460					
CI059470					
CI059480					
CI059490					
CI059500					
CI059510					
CI059520					
CI059530					
CI059540					
CI059550					
CI059560					
CI059570					
CI059580					
CI059590					
CI059600					
CI059610					
CI059620					
CI059630					
CI059640					
CI059650					
CI059660					
CI059670					
CI059680					
CI059690					
CI059700					
CI059710					
CI059720					
CI059730					
CI059740					
CI059750					
CI059760					
CI059770					
CI059780					
CI059790					
CI059800					
CI059810					
CI059820					
CI059830					
CI059840					
CI059850					
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CI059870					
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CI059960					
CI059970					
CI059980					
CI059990					
CI060000					
CI060010					
CI060020					
CI060030					
CI060040					
CI060050					
CI060060					
CI060070					
CI060080					
CI060090					
CI060100					
CI060110					
CI060120					
CI060130					
CI060140					
CI060150					
CI060160					
CI060170					
CI060180					
CI060190					
CI060200					
CI060210					
CI060220					
CI060230					
CI060240					
CI060250					
CI060260					

Run	Time	Temp	Pressure	Flow	Conc	Weight	Volume	Area	Height	Width	Length	Depth	Surface	Volume	Weight	Conc	Flow	Pressure	Temp	Time
3727	48	102E	8E8B	(0058)	CLSD	D ₀ =D1	FFFF	12, 13	DP059390											

3728	58	102F	C020	FET	2,0	FFFF	11, 10, 9	DP059400
------	----	------	------	-----	-----	------	-----------	----------

[illegible]

108	\$1
C020	FET
1033	FET
1031	FEIM
14C0FFFF	0
2730	U99A(PFFFF)
3731	U99A(PFFFF)
059420	"OUTPUT STATE OF ALL LAMPS TO C/IDP059430

3732	60	1034	F4A70003	PT R	10,C_I_LEFT_DISPLAY	CI059440
------	----	------	----------	------	---------------------	----------

3733	70	1036	F4180013	FEYM	1, 19	"SET UP A TIMER TO DELAY TWO "SECOND COUNTER OCCURING TO THE #S059450
------	----	------	----------	------	-------	---

	72	1038	9431	*	
7234					
7235					
7236					
7237					
7238					
7239					
7240					
7241					
7242					
7243					
7244					
7245					
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7325					
7326					
7327					
7328					
7329					

DP059480
DPO62718
CYCLE
"SAVE PANEL MODE AND PRESENT
2", PANELTIME PT R \$2
F427IF45
I039
18R
7375
1008
REB.
PAGE

DP059490	* * *	"VALUE OF THE TIMER
----------	-------	---------------------

3736	26	*	TEST EQU END OF SECOND DECA
1038	D5F0		BBK
1039	D5F0		IS
"EXIT PANEL PROGRAM"			
CLOSING CLOSER			
CLOSING CLOSER			

TEST	PERCENT	OF	SECOND	DECAY	0.0% PANEL TIME	"READ PRESENT VALUE OF TIMER
					FEED	
3737	14R				F80C1F45	\$3
3738	103C					
3739						
3740						
3741						
3742						
3743						
3744						
3745						
3746						
3747						
3748						
3749						
3750						
3751						
3752						
3753						
3754						
3755						
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3762						
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3764						
3765						
3766						
3767						
3768						
3769						
3770						
3771						
3772						
3773						
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3778						
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3780						
3781						
3782						
3783						
3784						
3785						
3786						
3787						
3788						
3789						
3790						
3791						
3792						
3793						
3794						
3795						
3796						
3797						
3798						
3799						
3800						
3801						
3802						
3803						
3804						
3805						
3806						
3807						
3808						
3809						
3810						
3811						
3812						
3813						
3814						
3815						
3816						
3817						
3818						
3819						
3820						

```

*
* INCREMENT TIMER
*1059530

```

[illegible][illegible]

*
"IS THIS THE
*2059570

3741	12	1043	D059	(104D)	BRL	\$4
						\$4
						"START OF THE SECOND PART OF THE DPO59580

* * *

WISIP (MODE=I)

WIS THIS THE

DP059550

D2068400

12 11113 11111

LOC	MOD	36	05/13/76	AN/BRN-7	BRE	\$6	START OF THE THIRD PART OF THE	PAGE 169
3742	1044	D061	(1046)	*	BRE	\$6	"TEST? (MODE=-2)	DP059610
3743	1045	D00E	(1054)	*	BUC	\$5	"TEST COMPLETE"	DP059620
3744	1046	A410		\$6	CLA	1,0	"SET SAME BIT PATTERN IN RIGHT	DP059630
3745	1047	8C21		*	CLSM	2,1	"LEGEND AS LEFT LEGEND	DP059640
				*			"OUTPUT LEGEND DISPLAYS TO C/I	DP059650
				*			"SET MODE = -1	DP059670
3746	1048	FC070007			PTRD	0, C, I, LEFT_DISPLAY_LEGEND_AND_PUNCTUATION	DP059680	
3747	104A	F4180013			FETM	1,19	"SET TIMER TO DELAY 2 SECONDS	DP059690
3748	104C	D904	(1039)		BUC	\$2		DP059700
				*		CHANGE DMA BIT PATTERN	CI059710	
3749	104D	B800		\$4	SUBD	0,0	"SET BIT PATTERN TO TURN OFF ALL	DP059720
3750	104E	8450			FETM	5,0	"LAMPS ON THE C/I	DP059730
3751	104F	867A	(00FA)	*	FET	0, HX0800		DP059740
3752	1050	2E7A	(00FA)	*	FAIL	10, HX0800	"SET THE SYSTEM OK AND COMPUTER	*1059750
				*			"OK BITS TO TURN MALF LAMP OFF	DP059760
				*				*H059770
				*				*H059780
				*				*H059790
				*				*H059800
				*				*H059810
				*				059820
3753	1051	FC098888		*			FFFF 5,4,3 AND START DELAY	* 059830
3754	1053	DA01	(1033)	*	BUC	\$1		CI059840
				*		RESTORE QUIESCENT MODE	"TEST COMPLETE"	059850
3755	1054	B800		\$3	SUBD	0,0		059860
3756	1055	F807002E			STAD	0, TEST_FAIL_TEMP		059870
3757	1057	9E9E	(009E)	*	CLAO	0, IMAGE9		
				*			"RESTORE STATUS AND MISCELLANEOUS	DP059880
				*			"LAMPS TO THEIR STATE AT THE	DP059890
				*			"START OF TEST	DP059900
3758	1058	FC070009			PTRD	0, C, I, OUTPUT_LAMPS_MISCELLANEOUS_SWITCHES		DP059910
3759	105A	867A	(00FA)	*	FET	0, HX0800	"PUT BITS INTO C/I INPUT WORD TO	DP059920
				*			"SIMULATE THE DEPRESSING OF MORE	DP059930
				*			"THAN ONE BUTTON. THIS WILL	DP059940
				*			"CAUSE THE PANEL INPUT ROUTINE	DP059950
				*			"CLEAR THE PANEL	DP059960
3760	105B	F4070001			PTR	0, C, I, INPUT_MISCELLANEOUS_SWITCHES (CLEAR)		DP059970
3761	105D	9C00			CLAM	0,0	"SET MODE = 0 = QUIESENT	DP059980
3762	105E	F4071F47			PTR	0, PANELMODE		CI059990
				*		SEQUENCE TO PANEL INPUT ROUTINE		*H060000
				*		TO FORCE A PANEL CLEAR OPERATION		*H060010

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DP060020

PANEL INPUT

* THIS PROGRAM PROCESSES ALL C/I PANEL INPUTS. IT IS AN INTERRUPT
* ROUTINE ENTERED WHENEVER A BUTTON IS DEPRESSED ON THE PANEL. IT IS
* ALSO ENTERED AFTER PANEL TEST. THE PANEL INPUT WORDS WILL CONTAIN A
* BIT THAT IDENTIFIES WHICH BUTTON WAS DEPRESSED. THIS ROUTINE CONTROLS
* ALL INSERT AND DISPLAY PROCEDURES.

*H060030
*H060040
*H060050
*H060060
*H060070
*H060080
*H060090
*H060100
CI060110
CI060120
CI060130
CI060140
CI060150
CI060160
CI060170
CI060180
CI060190
CI060200
CI060210
CI060220
CI060230
CI060240
CI060250
CI060260
CI060270
CI060280
CI060290
CI060300
DP060310
DP060320
DP060330
DP060340
*2060350
DP060360
DP060370
*H060380
*H060390
CI060400
DP060410
*LAMP AND LEGENDS FOR USE BY THE DP060420
DP060430
CI060440

CONTROL AND INDICATOR PANEL INPUT INTERRUPT ROUTINE

REGISTER ALLOCATION
0 7 LEFT LEG
1 8 RIGHT LEG
2 DMA 9 SWITCH LAMPS
3 10 HALF LAMPS
4 WORD 11 TOP LEFT ; KEY-
5 12 TOP RIGHT ; BOARD
6 13 LOWER ; LAMPS

7 PANEL MODE
8 SWITCH MASK
9 KEYBRD MASK, AND INPUT
A DIGIT COUNT
B THREE
C WORKING
D REGISTERS

"SET UP NORMALIZE COUNTER TO
"DETERMINE WHICH BUTTON
"READ PANEL MODE, SWITCH MASK,
"KEYBOARD MASK AND DIGIT COUNT
"
"IS THE PANEL IN THE TEST MODE?
"(MODE NEGATIVE)

"NOTE - ALL BUTTONS ARE IGNORED
DURING PANEL TEST
6,,C,,LEFT_DISPLAY_LEGEND_AND_PUNCTUATION
"READ CURRENT STATE OF ALL PANEL
"LAMP AND LEGENDS FOR USE BY THE DP060420
"VARIOUS PROCEDURES
11,,8,,C,,INPUT_MISCELLANEOUS_SWITCHES

PANEL_INPUT FETM 2,,14
FET 3,,PANELMODE

8RL PANOUT\$3
NOTE - ALL BUTTONS ARE IGNORED
DURING PANEL TEST
FET 6,,C,,LEFT_DISPLAY_LEGEND_AND_PUNCTUATION

EXTD

1060 842E
1061 F03C1F47

1063 04Q510A5

1065 FC6C0007

1067 EC680001

10R
32

38

34R

44

3763
3764

3765

3766

3767

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"LOGICALLY 'AND' THE C/I INPUT
"WORDS WITH THE SWITCH AND KEY-
"BOARD MASKS. THE MASKS DEFINE
"THE VALID BUTTON INPUTS.

DP060450

DP060460

DP060470

DP060480

CI060490

*1060500

DP060510

*060520

*060530

*1060540

DP060550

*DP060560

060570

060580

*060590

060600

060610

060620

*H060630

*H060640

*H060650

DP060660

DP060670

DP060680

DP060690

DP060700

DP060710

060720

060730

060740

*S060750

DP060760

DP060770

*H060780

*H060790

060800

060810

060820

060830

060840

060850

060860

060870

11,,C,I_INPUT_MISCELLANEOUS_SWITCHES

"WERE ANY INVALID

"BUTTONS DEPRESSED?"

INPUT ERROR

11,,=D1

11,11,C,I_INPUT_MISCELLANEOUS_SWITCHES

"WAS MORE THAN

"ONE BUTTON DEPRESSED?"

INPUT ERROR

12,,C,I_INPUT_MISCELLANEOUS_SWITCHES

\$3

12,,C,I_INPUT_KEYBOARD_SWITCHES

11,12,HXE000

\$1

HOLD,DISPLAY,CLEAR OR

INSERT ACCEPT IN R11

"SAVE KEYBOARD INPUT WORD WHICH

"IDENTIFIES THE BUTTON

"NORMALIZE INPUT WORD TO GET THE

"NUMBER OF THE KEYBOARD BUTTON

"0/A/POS BUTTON = 0

"S/W/SUB V/H BUTTON = 14

TEST FOR LOOP/FLOAT FIX-

PREVENTS PROGRAM HALT WHEN

SWITCH NOT SENDING CODE.

"RESUME PROCEDURE"

"PROCWORD POINTS TO THE NEXT

"INSTRUCTION IN THE PROCEDURE

HOLD/NORMAL

ACCEPT/INSERT

CLEAR/DISPLAY

PANEL TEST

TOGGLE ANTENNA

COMD

BNE

SUBD

EXTD

BNE

ONE VALID BUTTON HAS

BEEN DEPRESSED

12,,C,I_INPUT_MISCELLANEOUS_SWITCHES

\$3

12,,C,I_INPUT_KEYBOARD_SWITCHES

EXT

BNE

\$1

KEYBOARD BUTTON ONLY OCCURS

AFTER A PROCEDURE HAS BEEN

INITIATED

CLA

9,12

NML

FET

PRN

BRE

12,13

0,,PROCWORD

0

INPUT ERROR

BUC

I,,PROCWORD

SWITCH INPUT - THESE BUTTONS

EITHER START OR END PROCEDURES

\$1

BRL

HCONTROL

11,13

13,,13

IX13,,\$2

INSACC

CUN

DISTART

PANTEST

FLOAT_LOOP

1069 F880001

1068 040110AA

1060 F88000E8

106F EC8B0001

1071 0318 (10AA)

1072 F4CA0001

1074 D116 (108B)

1075 F4CA0002

1077 E48C112D

1079 D018 (1082)

107A A49C

107B D6C0

107C F00C1F44

107E D700

107F D26A (10AA)

1080 06001F44

1082 D25C (10AF)

1083 D68D

1084 900D

1085 C7D01087

1087 112F

1088 10C5

1089 10AD

108A 108D

1082 D25C (10AF)

1083 D68D

1084 900D

1085 C7D01087

1087 112F

1088 10C5

1089 10AD

108A 108D

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060880
060890
060900

MOD 36 05/18/76 AN/BRN-7
NML 12,13
ADDN 13,12
BUC IX13,s2

1088 06CD
108C 9402
108D 07001087

36R
38
48

3792
3793
3794

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DP061090
 *H061100
 *H061110
 *H061120
 *H061130
 *H061140
 *H061150
 *H061160
 DP061170
 DP061180
 DP061190
 DP061200
 DP061210
 DP061220
 061230
 061240
 DP061250
 DP061260
 CI061270
 DP061280
 DP061290
 DP061300
 *S061310
 DP061320
 DP061330
 DP061340

INPUT KEYBOARD BUTTON

* THIS ROUTINE IS USED TO EXIT THE PANEL INTERRUPT ROUTINE WHILE A
 * PROCEDURE IS IN PROCESS. FIRST IT BUILDS THE KEYBOARD MASK FROM THE
 * LAMPS TURNED ON BY THE PROCEDURE AND THEN IT OUTPUTS THE STATE OF ALL
 * LAMPS AND LEGENDS TO THE C/I PANEL.

3802	2R	109C	9C60	CLAM	6,0	"INPUT UPPER LEFT KEY ENTRY "
3803	2R	109D	A494	CLA	9,4	"TURN OFF LOWER KEYBOARD LAMPS "
3804	4	109E	B495	ADD	9,5	"INPUT LOWER KEY ENTRY"
3805	6	109F	B496	ADD	9,6	"FORM KEYBOARD SWITCH MASK "
3806	14	10A0	E4D81783	EXT	13,8,HXFO00	
3807	16	10A2	B49D	ADD	9,13	
3808	34R	10A3	F4670007	PTR	6,C,I,LEFT_DISPLAY_LEGEND_AND_PUNCTUATION "TO C/I	"= UPPER LEFT LAMPS + UPPER RIGHT " LAMPS + LOWER LAMPS
3809	22R	10A5	F4371F47	PTR	3,PANELMODE	"SAVE MODE, MASKS, DIGIT COUNT "
3810	38	10A7	D520	BBK	2	"EXIT PANEL INTERRUPT"
3811	2R	10A8	9C40	CLAM	4,0	"INPUT UPPER RIGHT KEY ENTRY "
3812	6	10A9	D80E (109C)	BUC	PANOUT	"TURN OFF UPPER LEFT LAMPS "

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3813	70R	10AA 1C00	INPUTERRCR INPUT	CLEAR_PANEL	"PLACE PANEL IN QUIESCENT STATE	*C1061350
3814	76	10AB 04C01110	BUC	DISFINAL\$2	"MODE=0, INSERT, ACCEPT, DISPLAY OFF	*H061360
3815	2R	10AD 8C74	PANEL TEST ENTRY	7, 4	"TURN ON INSERT, DISPLAY - EXIT	*C1061370
3816	6	10AE D80C (10A3)	PANTEST BUC	PANOUT\$2	"INTERRUPT ROUTINE AT DISFINAL\$2	*H061380
3817	6R	10AF 5428	HOLD / NORMAL ENTRY	2, 3	"SET PANEL MODE = TEST (-4)	DP061430
3818	10	10BQ D057 (10B8)	HCONTROL LSE BRL	\$1	"HOLD ON	C1061440
3819	8R *	10B1 F8G014EE	BSV	VARSAVE	"EXAMINE HOLD LAMP	*H061450
3820	14	10B3 F425200C	LSE	2, 13	"START HOLD MODE"	061460
3821	18	10B5 F4291000	ADDN	PANOUT\$2	"TRANSFER VARIABLES FOR DISPLAY	061470
3822	22	10B7 D905 (10A3)	BUC	2, 13	"TURN HOLD ON	DP061490
3823	6R	10B8 F425200C	LSE	2, 13	"TURN HOLD OFF	061510
3824	10	10BA FC29100C	SUBM	2, X(1000)		061520
3825	14	10BC D90A (10A3)	BUC	PANOUT\$2		061530
3826	10R	10BD F00C1F8C	FLUAT_LOOP FET	0, FLOATER	TOGGLE FLOATER MARKER	061540
3827	12	10BF 9001	SUBM	0, 1		C1061550
3828	16	10C0 D061 (10C2)	BRE	\$1		DP061560
3829	2R	10C1 9402	ADDN	0, 2		061570
3830	10R	10C2 F4071F8C	PTR	0, FLOATER		061580
3831	14	10C4 DA02 (10A3)	BUC	PANOUT\$2		061590

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DISPLAY PROCEDURES

* * * ENTER HERE WHEN THE DISPLAY BUTTON IS DEPRESSED. ALL DISPLAY PRO-
* * * CEDURES ARE INITIATED AND CONTROLLED FROM HERE

*PLACE PANEL IN QUIESCENT STATE
*MODE=0, INSERT, ACCEPT, DISPLAY OFF
*TURN ON ALL LOWER LAMPS AS EACH
*ONE IS A VALID DISPLAY

CLEAR_PANEL
6,,X(1FFF)

DI START
INPUT
CLAM

3832 70R 10C5 1C00
3833 74 10C6 FC691FFF

LOWER_KEY
13,,CALLWORD

INPUT
STA

3834 144 10C8 1C03
3835 154 10C9 F0071F40

9,,IMAGE13

STA

3836 164 10C8 F0571F3F

*SAVE BIT THAT TURNS ON THE LAMP
*FOR THIS PROCEDURE IN IMAGE13
*FOR USE WHEN THE PROCEDURE IS
*COMPLETE
*GO TO SELECTED PROCEDURE"
*USE PROCEDURE NUMBER (BASED ON
*THE NUMBER OF THE SELECTED LOWER
*KEY) TO INDEX A TABLE OF POINT-
*ERS TO THE CORRECT PROCEDURE

IX13,,\$10
0 = DISFINAL
1 = \$55
2 = DISFINAL
3 = NCT_DISPLAY
4 = \$3
5 = DISFINAL
6 = \$5
7 = DISFINAL
8 = \$21
9 = DISFINAL
10 = \$4
11 = \$1
12 = NCT_DISPLAY
DISFINAL
\$55
DISFINAL
NCT_DISPLAY

BU C
* EACH PROCEDURE
* WILL CONTROL
* ALL OPERATOR
* STEPS NECESSARY
* TO DEFINE THE
* DESIRED DISPLAY
* DISFINAL INDI-
* CATES THAT NO
* FURTHER STEPS
* ARE REQUIRED

3837 174 10C0 070010CF

SYNC

CSE-ETE
D_GMT
LOP
CAL H/S
MAN H/S
AUTO H/S
BRG/RNG
POSITION
COH
INPUTS
SYNC

CON
CON
CON
CON

3838 10CF 110B
3839 10D0 10F6
3840 10D1 110B
3841 10D2 1121

DP061630
#H061640
#H061650
#H061660
#H061670
#H061680
#H061690
#H061700
#H061710
#H061720
#H061730
#H061740
#H061750
#H061760
#H061770
#H061780
#H061790
#H061800
#H061810
#H061820
#H061830
#H061840
#H061850
#H061860
#H061870
#H061880
#H061890
#H061900
#H061910
#H061920
#H061930
#H061940
#H061950
#H061960
#H061970
#H061980
#H061990
#H062000
#H062010
#H062020
#H062030
#H062040
#H062050

3842	1003	10E1	CON	\$3	DISFINAL	CSE - ETE	062060
3843	1004	1108	CON	\$5	DISFINAL	D-GMT	062070
3844	1005	10F1	CON	\$21	DISFINAL	LOP	062080
3845	1006	1108	CON	\$4	DISFINAL	CAL H/S	062090
3846	1007	100C	CON	\$1	DISFINAL	MAN H/S	062100
3847	1008	1108	CON	\$1	DISFINAL	AUTO H/S	062110
3848	1009	10E5	CON	\$1	DISFINAL	BRG/RNG	062120
3849	100A	100F	CON	\$1	DISFINAL	POSITION	062130
3850	100B	1121	CON	\$1	DISFINAL	COH	062140
			CON	\$1	DISFINAL		062150
			CON	\$1	DISFINAL		062160
			CON	\$1	DISFINAL		062170

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* ENTER HERE FOR MAN H/S

4R 8

3851 100C F4491800 \$21

3852 100E D004 (10E3) \$33

4R X (1800)

WTURN DN SUB - RZ

3853	4R	10DF	F4490800	**	* ENTER HERE FOR POSITION	ADDN	4,X(0800)	"TURN ON SUB	DP062180
3854	4R	10E1	F44913FF	\$1	* ENTER HERE FOR ETE - CSE	ADDN	4,X(13FF)	"TURN ON 0-9,RZ UPPER LEFT LAMPS	DP062190
3855	8R	10E3	1C0C	\$3		ACCEPT		"TO SELECT POSITION TO BE OIS-	DP062200
3856	84	10E4	D206 (110B)	*		BUC		"PLAYED OR DESTINATION FOR ETE	DP062210
3857	4R	10E5	F44918FF	\$3		DISFNL		"WAIT FOR NEXT BUTTON - SAVE NO.	DP062220
3858	84	10E7	1C0C	\$4	* ENTER HERE FOR R-BRG	ADDN	4,X(18FF)	"IN ARG1 AND LAMP BIT IN IMAGE11	DP062230
3859	86	10E8	8049	*		ARGUMENT		"PROCEDURE COMPLETE"	DP062240
3860	94	10E9	E444112C	\$4		DISFNL		"TURN ON SUB, 0-9, RZ LAMPS TO	DP062250
3861	164	10E8	1C01	*		ARGUMENT		"SELECT START POINT FOR RANGE	DP062260
3862	174	10EC	F0D71F42	*		SUB		"WAIT FOR NEXT BUTTON - SAVE NO.	DP062270
3863	186	10EE	E0991F3D	*		ARGUMENT		"IN ARG1 AND LAMP BIT IN IMAGE11	DP062280
3864	190	10F0	D10A (110B)	*		STA		"TURN OFF THE SELECTED START	DP062290
3865	80R	10F1	1C0A	*		MRG		"POINT TO FORCE OPERATOR TO	DP062300
3866	160	10F2	1C0B	*		EXT		"SELECT AN END POINT DIFFERENT	DP062310
3867	162	10F3	9C4E	*		INPUT		"THAN THE START POINT	DP062320
3868	232	10F4	1C01	*		STA		"TURN OFF THE 'SUB' LAMP AS	DP062330
3869	236	10F5	D006 (10FC)	*		MRG		"DISPLAY ROUTINE CANNOT PROCESS	DP062340
3870	2R	10F6	9C4E	*		BUC		"SUB AS THE END POINT	DP062350
3871	6	10F7	FC691001	*		DISFNL		"WAIT FOR NEXT BUTTON"	DP062360
3872	76	10F9	1C03	\$5	* ENTER HERE FOR LOP	ACCEPT		"SAVE BUTTON NO. OF END POINT IN	DP062370
3873	86	10FA	F0D71F42	*		CLAM		"ARG2 FOR DISPLAY ROUTINE	DP062380
3874	2R	10FC	9001	\$6		INPUT		"SAVE LAMP BIT IN IMAGE11 WITH	DP062390
				\$5		BUC		"BIT OF START POINT LAMP	DP062400
				\$6		MRG		"PROCEDURE COMPLETE"	DP062410
				\$5		DISFNL		"WAIT FOR 2 BUTTONS - SELECTED	DP062420
				\$6		CLAM		"PAIR IN LEFT LEGEND DISPLAY	DP062430
				\$6		CLAM		"WAIT FOR 2 BUTTONS - CHOSEN PAIR	DP062440
				\$6		CLAM		"IN RIGHT LEGEND DISPLAY	DP062450
				\$6		CLAM		"TURN ON 1, 2 AND 3	DP062460
				\$6		CLAM		"TURN ON 1, 2, 3 AND	DP062470
				\$6		CLAM		"COH AND INPUTS	DP062480
				\$6		CLAM		"WAIT FOR 1 BUTTON	DP062490
				\$6		CLAM		"SAVE FOR STATUS DECODE	DP062500
				\$6		CLAM		"CHECK IF INPUTS	DP062510
				\$6		CLAM			DP062520
				\$6		CLAM			DP062530
				\$6		CLAM			DP062540
				\$6		CLAM			DP062550
				\$6		CLAM			DP062560
				\$6		CLAM			DP062570
				\$6		CLAM			DP062580
				\$6		CLAM			DP062590
				\$6		CLAM			DP062600

	6	LOFD D057 (1105)	BRL	STATUS_INPUTS	"YES	PAGE 179
3875	2R	LOFE 98D7	COMM	13,7	"CHECK IF COH	062610
3876	6	LOFF D035 (1105)	BRG	STATUS_INPUTS	"YES	062620
3877	10R	1100 F0071F41	STA	13, ARGWORD1	"SAVE SELECTED FREQUENCY	062630
3878	20	1102 F0571F3D	STA	9, IMAGE11	"AND LAMP BIT	062640
3879	24	1104 D006 (1108)	BUCL	DISFINAL		062650
3880			STATUS_INPUTS:			062660
3881	2R	1105 DE50	FLG	A+L	"FLAG A TRUE IF INPUTS	062670
3882	4	1106 9452	ADOM	9,2	"KEEP STATUS LIT	062680
3883	14	1107 F0571F3F	STA	9, IMAGE13		062690
3884	16	1109 9C40	CLAM	4,0		062700
3885	20	110A D146 (1121)	BAF	NCT_DISPLAY		062710
			* FALL INTO DISFINAL IF INPUTS			062720
						062730

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DP062740

**
* DISPLAY PROCEDURE COMPLETE
* THIS ROUTINE IS USED TO EXIT
* THE PANEL INTERRUPT ROUTINE
* AT THE END OF A PROCEDURE

DISFINAL CLAM 7,1

* SET DISPLAY MODE (= 1) THIS WILL DP062790
* CAUSE THE C/I PANEL NON OMEGA DP062800
* TASK ROUTINE TO GENERATE THE DP062810
* REQUESTED DISPLAY DP062820
* TURN ON KEYBOARD LAMPS FROM DP062830
* IMAGE11,12,13 TO REFLECT THE DP062840
* PROCEDURE SELECTED BY THE DP062850
* OPERATOR DP062860

\$1 CLAD 4, IMAGE11

\$2 CLA ADDM 6, IMAGE13
2,X(0A00)

\$3 ADDM EXT 8,X(6000)
2,2,MXFEFF

\$4 INPUT LOWER_KEY

BUC INPUT ERROR

* ENTER HERE TO END AN INSERT
* PROCEDURE AFTER THE ACCEPT
* BUTTON IS SELECTED

\$4 SUBM 2,X(0400)
SUBM 8,X(2000)
STA 7, ACCEPT_OLD

* TURN OFF THE ACCEPT LAMP AND
* DELETE IT FROM THE MASK
*
* SAVE MODE IN ACCEPT OLD MARKER DP063020
* THE MODE WILL BE ZERO UNLESS THE DP063030
* OPERATOR WAS IN A PROCEDURE DP063040
* WHERE THE OLD DATA WAS DISPLAYED DP063050
* ON THE PANEL (MODE = 1) AND IT DP063070
* WAS ACCEPTED WITHOUT CHANGE DP063080
* SET INSERT MODE (2) THIS WILL DP063090
* CAUSE THE C/I PANEL NON OMEGA DP063100
* TASK ROUTINE TO PROCESS THE DP063110
* INSERTED DATA DP063120
CI063130

CLAM 7,2

BUC \$1

* ENTER HERE FOR NCTR OR COM
NCT_DISPLAY CLAM 5, OSHEX

* TURN ON STATION LAMPS
* WAIT FOR ONE BUTTON - OPERATOR *1063160

3886 2R 1108 9C71

3887 10R 110C FC4A1F3D

3888 18 110E F46A1F3F
3889 4R 1110 F4290A00

3890 8 1112 F4896000
3891 16 1114 E422112A

3892 70R 1116 1C03

3893 76 1117 040010AA

3894 4R 1119 F0290400
3895 8 111B F0892000
3896 18 111D FC77002A

3897 20 111F 9C72

3898 24 1120 D905 (110C)

3899 4R 1121 FC5901FE

[illegible]

C1063320

INSERT PROCEDURES

#H063330

#H063340

#H063350

#H063360

#H063370

#H063380

#H063390

#H063400

#H063410

#H063420

#H063430

#H063440

#H063450

#H063460

#H063470

#H063480

#H063490

#H063500

#H063510

#H063520

#H063530

#H063540

#H063550

#H063560

#H063570

#H063580

#H063590

#H063600

#H063610

#H063620

#H063630

#H063640

#H063650

#H063660

#H063670

#H063680

#H063690

#H063700

#H063710

#H063720

#H063730

#H063740

* ENTER HERE WHEN THE ACCEPT/INSERT BUTTON IS DEPPRESSED. ALL INSERT
 * PROCEDURES ARE INITIATED AND CONTROLLED HERE. IF THE ACCEPT LAMP IS
 * ON THEN AN INSERT PROCEDURE IS COMPLETE OTHERWISE THE INSERT LAMP IS
 * ON AND A PROCEDURE IS TO BE INITIATED.

* EXAMINE THE ACCEPT LAMP
 * WAS THE ACCEPT BUTTON DEPRESSED? DP063410

* PLACE PANEL IN QUIESCENT STATE
 * MODE=0, ACCEPT, INSERT, DISPLAY OFF DP063430
 * TURN ON VALID LAMPS
 * VALID INSERTS POS, RZ-POS, DP063440
 * D-GMT, MAN-V/H, OMEGA-DR, RZ-V/H DP063470

* WAIT FOR OPERATOR TO SELECT AN
 * INSERT WITH A LOWER BUTTON
 * SAVE BUTTON NUMBER IN CALL FOR DP063490
 * USE BY THE INSERT ROUTINE AFTER DP063510
 * THE PROCEDURE IS COMPLETE. IT DP063520
 * WILL ALSO BE USED BY THE DISPLAY DP063530

* ROUTINE IF THE INSERT PROCEDURE DP063540
 * REQUIRES THE DISPLAY OF OLD DATA DP063550
 * MAKE ARG2 POSITIVE AS A MARKER
 * INDICATING A GENERAL INSERT
 * DP063570

* SAVE LAMP BIT IN IMAGE13 TO TURN DP063600
 * ON THE SELECTED LOWER LAMP AT
 * THE END OF THE PROCEDURE
 * POSITION
 * DP063620

* THE BUTTON NO. 2 = \$21 RZ POS
 * IS USED TO SE- 8 = \$9 D-GMT
 * LECT THE INSERT 9 = \$10 MAN-V/H
 * PROCEDURE FROM 10 = \$11 OMEGA-DR
 * A TABLE OF 12 = \$10 RZ-V/H
 * POINTERS UNLESS
 * THE BUTTON IS
 * POS (=0)

* \$7 IS THE ADDRESS OF THE INSERT TABLE
 * WAS THE POSITION

AD-A050 501

NORTHROP CORP HAWTHORNE CALIF ELECTRONICS DIV
AN/BRN-7 COMPUTER PROGRAM SPECIFICATION. VOLUME
OCT 73

F/6 17/7
XIII. APPENDIX.(U)
N00039-73-C-0209

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NORT-73-48

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3919	186	1130	07051161	BRL	IX13,,S7	INSERT PROCEDURE SELECTED	PAGE 183
3920	4R	113F	FC4913FF	* POSITION INSERT	4,,X(13FF)	"TURN ON RZ,DIGITS 0-9 TO	2R063750
				\$1		"SELECT A DESTINATION POSITION	*H063760
3921	12	1141	E40200E3	EXT	13,2,HX4000	"IS THE ENTER TIME LAMP OFF?	063770
3922	16	1143	D012 (1146)	BNE	\$19	"ALLOW SHIP POSITION INSERTS	DP063780
3923	4R	1144	F4490800	ADDM	4,,X(0800)	"TURN ON SUB LAMP	063790
				*		"WAIT FOR NEXT BUTTON - SAVE NO.	2R063800
3924	80R	1146	1C0C	ACCEPT ARGUMENT		"IN ARG1 AND LAMP BIT IN IMAGE11	063810
				\$19		"TURN ON N AND S LAMPS FOR	DP063820
3925	4R	1147	FC590801	* ENTER HERE FOR RZ POS	5,,X(0801)	"CHANGE ARG2 TO NEGATIVE TO MARK	*H063850
3926	6	1149	9C40	CLAM	4,,0	"A SPECIAL INSERT	DP063860
3927	8	114A	9808	COMM	13,,11	"NOTE - THIS MARKER IS USED BY	063870
				*		"THE ROUTINE ACCEPTING	DP063880
3928	12	1148	D019 (1155)	BNE	\$2	"DIGITS TO SELECT THE	*H063890
				* CRAFT POSITION INSERT		"POSITION QUALITY BEFORE	063900
3929	2R	114C	8CD1	CLSM	13,,1	"IS THIS THE"	*H063910
				*		"FIRST POSITION INSERT?"	DP063920
3930	12	114D	F0071F42	STA	13,,ARGWORD2	"(ENTER P ON)	DP063930
3931	20	114F	E40200E4	EXT	13,2,HX8000	"ALLOW OPERATOR TO SELECT CURRENTDP064020	DP063940
				*		"CRAFT POSITION WITHOUT CHANGE	DP063950
3932	24	1151	D063 (1155)	BRE	\$2	"SET MODE = 1 TO DISPLAY POSITIONDP064050	*H063980
3933	2R	1152	9C71	CLAM	7,,1	"WAIT FOR 1 BUTTON (N OR S) END	2R064000
				*		"PROCEDURE IF ACCEPT PUSHED	DP064010
3934	72	1153	1C04	INPUT	WITH_ACCEPT_LIGHT	"N OR S IS NOW IN - THE REST OF	DP064020
				*		"THE PROCEDURE IS COMMON TO	DP064030
3935	76	1154	D001 (1156)	SUC	\$3	"DESTINATION PROCEDURE	DP064040
				* DEST 0-9 RZ		"WAIT FOR OPERATOR TO SELECT	DP064050
3936	70R	1155	1C02	INPUT	UPPER_RIGHT_KEY	"NORTH OR SOUTH	*H064120
3937	4R	1156	FC09A02E	CLAM	0,,X(1A02E)	"SET UP TO DISPLAY N IN THE LEFT	064130
				*		"LEGEND AND PUNCTUATION IN LEFT	064140
3938	6	1158	9A08	COMM	13,,11	"DISPLAY REGISTER"	DP064150
				*		"WAS NORTH"	064160
				*			*H064170

MOD	36	05/18/76	AN/ARN-7	10	1159	0062	(115C)	115A	FC09A033	115C	IC07	\$4	*\$4	0,X(A033)	FIVE_DIGITS	1150	IC09	115E	F419A000	1160	IC08	\$7	1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08
3939	10	1159	0062	(115C)	115A	FC09A033	115C	IC07	\$4	*\$4	0,X(A033)	FIVE_DIGITS	1150	IC09	115E	F419A000	1160	IC08	\$7	1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08			
3940	4R	115A	FC09A033	115C	IC07	\$4	*\$4	0,X(A033)	FIVE_DIGITS	1150	IC09	115E	F419A000	1160	IC08	\$7	1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08						
3941	80R	115C	IC07	\$4	*\$4	0,X(A033)	FIVE_DIGITS	1150	IC09	115E	F419A000	1160	IC08	\$7	1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08								
3942	160	1150	IC09	115E	F419A000	1160	IC08	\$7	1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08														
3943	164	115E	F419A000	1160	IC08	\$7	1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																
3944	244	1160	IC08	\$7	1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																		
3945		1161	1189	1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																					
3946		1162	0000	1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																							
3947		1163	0000	1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																									
3948		1164	0000	1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																											
3949		1165	0000	1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																													
3950		1166	116A	1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																															
3951		1167	0000	1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																	
3952		1168	0000	1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																			
3953		1169	1179	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																					
3954	8R	116A	E4D200E3	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																							
3955	12	116C	006A	(1177)	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																									
3956	2R	116D	9C71	116E	FC49C3FF	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																								
3957	6	116E	FC49C3FF	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																										
3958	76	1170	IC04	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																												
3959	80	1171	FC891178	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																														
3960	90	1173	FO871F43	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																																
3961	92	1175	8CAA	1176	D302	(11A9)	1177	IC08	1178	IC08																																																		
3962	96	1176	D302	(11A9)	1177	IC08	1178	IC08																																																				
3963	80R	1177	IC08	1178	IC08																																																							
3964	80R	1178	IC08																																																									

"SELECTED BY THE OPERATOR?"
 "CHANGE LEGEND TO S"
 "WAIT FOR 5 DIGIT LATITUDE INSERT DP064200
 "WAIT FOR OPERATOR TO SELECT E/W *I064210
 "SET UP RIGHT LEGEND WITH E OR W DP064220
 "DISPLAY PUNCTUATION IN THE RIGHT DP064230
 "DISPLAY REGISTER DP064240
 "FINISH PROCEDURE" *I064250
 "6 DIGIT LONG/A,B,C IF SUB/ACCEPT DP064260
 C1064270
 064280
 DP064290
 DP064300
 DP064310
 DP064320
 DP064330
 DP064340
 DP064350
 DP064360
 *H064370
 064380
 *2064390
 3R064400
 DP064410
 DP064420
 DP064430
 DP064440
 DP064450
 DP064460
 DP064470
 DP064480
 DP064490
 DP064500
 DP064510
 DP064520
 DP064530
 DP064540
 DP064550
 DP064560
 *I064570
 DP064580
 *I064590
 DP064600

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* ENTER HERE FOR MAN-V/H *H064610

* ENTER HERE FOR RZ-V/H *H064620

\$10 4,,X(1800) "TURN ON SHIP AND RZ

CLAM ARGUMENT

ACCEPT

CLAM 0,,X(8024) "DISPLAY D IN LEFT DISPLAY

STA 0,,HEADING_GROUP "FLAG HEADING AS SPECIAL

* "TURN ON PUNCTUATION IN LEFT

* "DISPLAY REGISTER

SIX_DIGITS "WAIT FOR 3 DIGIT HDG INSERT

1,,X(2028) "TURN ON PUNCTUATION IN RIGHT

ACCEPT CLAM "DISPLAY REGISTER

* "FINISH PROCEDURE"

* "TEST FOR RZ V/H

FET 0,,ARGWORD1

COMM 0,,12

PRN 0

BRE PLOT11\$1

ACCEPT THREE_DIGITS

* ENTER HERE FOR INPUTS

\$11 4,,X(0400) "TURN ON ALL STATION LAMPS

CLAM 5,,X(03FE) "AND AUTO AND MAN

CLAM 2,,X(0400) "TURN ON ACCEPT LAMP AND ENABLE

ADD 8,,X(2000) "ACCEPT IN THE SWITCH MASK - THIS

* "WILL ALLOW THE OPERATOR TO

* "ACCEPT WHEN THE OMEGA STATION

* "LAMPS ON ARE THE CORRECT SET

\$12 4,,IMAGE11 "SAVE LAMPS NOW ON IN

STAD "IMAGE11/12 FOR DISPLAY AT END OF

* "PROCEDURE AND INSERT ROUTINE

* "WAIT FOR 1 STATION TO BE TURNED

* "OFF - END PROCEDURE IF ACCEPT

UPPER_LEFT_KEY "TURN OFF SELECTED LAMPS

4,,=D1

4,9

SUB 5,9 "ALLOW OPERATOR TO TURN OFF

SUB 4,,4,IMAGE11 "ANOTHER

EXTD \$12 "LAMP

BUC INSACCS1

EQU PLOT11

ACCEPT \$1 FOUR_DIGITS 4 DIGIT VELOCITY FOR RZ

PT064960

064970

C1064980

*H064990

*H065000

*H065010

*H065020

*H065030

*H065040

*H065050

*H065060

*H065070

*H065080

*H065090

*H065100

DIGIT INPUT

* THIS ROUTINE PROCESSES STRINGS OF DIGITS AS REQUESTED BY THE CALLING
* PROGRAM. IT HAS ENTRIES FOR STRINGS OF 2, 3, 5 AND 6 DIGITS. ALL
* DIGITS ARE DISPLAYED IN THE APPROPRIATE REGISTER AS INDICATED BY
* WINDOWAD. IT IS ASSUMED THAT THE LAST DIGIT IN GOES INTO THE RIGHT
* MOST DIGIT OF THE DISPLAY AND ALL OTHERS ARE PLACED ACCORDINGLY. IT
* HAS SPECIAL PROVISIONS TO INCREMENT THE WINDOWAD BY 2 AT THE END OF
* EACH SEQUENCE. IT WILL LOOK FOR A SPECIAL INSERT AND REQUEST POSITION
* QUALITY DATA IF REQUIRED. IF THE DISPLAY REGISTER IS THE RIGHT DIS-
* PLAY IT WILL TURN ON THE ACCEPT LAMP AT THE END OF THE SEQUENCE

3989	2R	119C	8CA2	INSTWO	CLSM	10,2	"INITIALIZE COUNTER FOR 2 DIGITS	DP065110
3990	6	119D	D007		BUC	INSSIX\$1		DP065120
3991	2R	119E	8CA4	INSTHREE	CLSM	10,4	"INITIALIZE COUNTER FOR 3 DIGITS	DP065130
3992	6	119F	D005		BUC	INSSIX\$1		CI065140
3993	2R	11A0	8CA6	INSFOUR	CLSM	10,6	"INITIALIZE COUNTER FOR 4 DIGITS	065150
3994	6	11A1	D003		BUC	INSSIX\$1		065160
3995	2R	11A2	8CA8	INSFIVE	CLSM	10,8	"INITIALIZE COUNTER FOR 5 DIGITS	DP065170
3996	6	11A3	D001		BUC	INSSIX\$1		CI065180
3997	2R	11A4	8CAA	INSSIX	CLSM	10,10	"INITIALIZE COUNTER FOR 6 DIGITS	DP065190
3998	4R	11A5	FC4903FF	\$1	CLAM	4, X(03FF)	"TURN ON DIGIT LAMPS 0 - 9	DP065200
3999	6	11A7	9C50		CLAM	5,0	"CLEAR UPPER RIGHT KEYS	065210
4000	70R	11A8	1C01	*	INPUT	UPPER_LEFT_KEY	"WAIT FOR THE OPERATOR TO SELECT	DP065220
4001	14R	11A9	FEBAC0A5	\$3	CLAD	111, WINDOWAD	"ONE DIGIT	DP065230
				\$4			"READ LEFT OR RIGHT DISPLAY USINGDP065240	DP065250
				*			"WINDOWAD AS A POINTER	
				*			"EACH DIGIT IN THE DISPLAY NOT	DP065260
				*			"YET INSERTED IS A BLANK WHICH	ISDP065270
				*			"A BCD 15	DP065280
				*			"FORM INSERTED DIGIT NUMBER - 15	DP065290
				*			"SO THAT IT WILL BE CORRECT AFTERDP065300	
				*			"IT IS ADDED TO THE DISPLAY	DP065310
4002	16	11AB	90DF	*	SUBM	13,15	"USE DIGIT COUNT TO DETERMINE	*S065320
				*			"THE NUMBER OF SHIFTS NECESSARY	DP065330
				*			"TO PLACE THE DIGIT IN THE COR-	DP065340
				*			"RECT DISPLAY CHARACTER	DP065350
				*			"	DP065360
				*			"BRANCH INDEXED BY DIGIT COUNT	DP065370
				*			"TO A TABLE OF SHIFT INSTRUCTIONSDP065380	
				*			"\$6 IS JUST A REFERENCE POINT	DP065390
4003	22	11AC	05A011B8	*	BUC	X10,\$6	"IN THE TABLE FOR INDEXING	DP065400

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4004	4R	11A E F4D4001C	* ENTER HERE FOR SIXTH POSITION LSA 13.4
4005	8	11B 0 F4D40010	* ENTER HERE FOR FIFTH POSITION LSA 13.4
4006	12	11B 2 F4D40010	* ENTER HERE FOR FOURTH POSITION LSA 13.4
4007	14	11B 4 8480	* ENTER HERE FOR THIRD POSITION ADD 11.13
4008	18	11B 5 0005 (11B8)	* ENTER HERE FOR SECOND POSITION 1BUC \$7
4009	4R	11B 6 F4D40010	* ENTER HERE FOR FIRST POSITION LSA 13.4
4010	4R	11B 8 F4D40100	* \$6 LSA 13.8
4011	6	11B A 84CD	ADD 12.13
4012	16R	11B B FA9700A5	STAD 111. WINDOWAD
4013	24	11B D F48A1C03	CLA 11. HEADING_GROUP
4014	28	11B F D066 (11C6)	BRE \$9
4015	4R	11C 0 F8A9FFFA	COMM 10. --6
4016	8	11C 2 0013 (11C6)	BNE \$9
4017	2R	11C 3 80AA	SUB 10. 10
4018	12	11C 4 FOA71C03	STA 10. HEADING_GROUP
4019	2R	11C 6 9C80	CLAM 11. 0
4020	10	11C 7 CEA3 (11A5)	* \$9
4021	2R	11C 8 9C40	* BXUD 10. \$1
4022	10	11C 9 F4DA00A5	* CLAM 4. 0
4023	12	11C B 9402	* CLA 13. WINDOWAD
4024	22	11C C F0D700A5	* ADDM 13. 2
4025	24	11C E 98D5	* STA 13. WINDOWAD
			* COMM 13. C. I RIGHT_DISPLAY
			* IF THIS IS THE END OF THE LEFT
			* DISPLAY SEQUENCE THE ROUTINE
			* WILL RETURN TO THE NEXT STEP
			"SHIFT DIGIT OVER 1 CHARACTER DP065410
			"SHIFT DIGIT OVER 1 CHARACTER DP065420
			"SHIFT DIGIT OVER 1 CHARACTER DP065430
			"SHIFT DIGIT OVER 1 CHARACTER DP065440
			"SHIFT DIGIT OVER 1 CHARACTER DP065450
			"ADD DIGIT TO THE DISPLAY WORD DP065460
			"FOR THE 4 HIGH ORDER DIGITS DP065470
			"SHIFT DIGIT OVER 1 CHARACTER DP065480
			"FOR THE 4 HIGH ORDER DIGITS DP065490
			"SHIFT DIGIT OVER 1 CHARACTER DP065500
			"SHIFT DIGIT OVER 2 CHARACTERS DP065510
			"BECAUSE 2 LOW ORDER DIGITS OCCUR DP065520
			"IN THE MOST SIGNIFICANT BITS OF DP065530
			"THE WORD DP065540
			"ADD DIGIT TO THE DISPLAY WORD DP065550
			"RESTORE UPDATED DISPLAY FOR DP065560
			"OUTPUT TO THE C/I PANEL DP065570
			"TEST FOR HEADING DP065580
			"AND DP065590
			"EXIT AFTER DP065600
			"INSERT OF THREE DP065610
			"DIGITS DP065620
			"INCREMENT DIGIT DP065630
			"COUNT - IS THE DIGIT SEQUENCE DP065640
			"COMPLETE? DP065650
			"TURN OFF DIGIT LAMPS 0 - 9 DP065660
			"INCREMENT WINDOWAD WHICH WILL DP065670
			"CHANGE IT TO RIGHT IF IT WAS DP065680
			"LEFT (CLEAR SETS IT TO LEFT) DP065690
			"NOTE - ALL PROCEDURES REQUIRE DP065700
			"THAT THE LEFT DIGITS BE DP065710
			"ENTERED FIRST. MOST DP065720
			"PROCEDURES END WITH THE DP065730
			"RIGHT DIGITS DP065740
			"DP065750
			"DP065760
			"DP065770
			"DP065780
			"DP065790
			"CI065800
			"#065810
			"#065820
			"#065830

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* IN THE PROCEDURE WHICH IS

* CONTAINED IN LINK

* WAS A LEFT

* DISPLAY REGISTER JUST COMPLETED? DP065870

* 065880

* 065890

* 065900

* IS THIS A

* GENERAL INSERT PROCEDURE?

* SPECIAL

* TURN ON A, B AND C FOR POSITION

* QUALITY

* WAIT FOR OPERATOR

* TO SELECT QUALITY

* SAVE QUALITY BUTTON NO. IN ARG2

* FOR INSERT ROUTINE

* KEEP THE QUALITY LAMP ON

* FOR ACCEPT

* ALLOW OPERATOR TO ACCEPT THE

* INSERTED DATA

* ERROR IF OPERATOR PUSHES ANY

* OTHER BUTTON

4026 34 11CF 06061F43

4027 8R 11D1 F40A1F42

4028 12 11D3 D026 (11DA)

4029 2R 11D4 9C5E

4030 72 11D5 1C02

4031 74 11D6 9001

4032 84 11D7 F0071F42

4033 86 11D9 A459

4034 70R 11DA 1C04

4035 76 11DB 040010AA

1, LINKWORD

13, ARGWORD2

RIGHT DISPLAY - PREPARE TO

END INSERT PROCEDURE

BRE

CLA

BGE

CLAM

INPUT

SUBM

STA

CLA

INSERT FINAL

INPUT

BUC

UPPER_RIGHT_KEY

13, 1

13, ARGWORD2

5, 9

WITH_ACCEPT_LIGHT

INPUTERROR

DP065840

DP065850

DP065860

DP065870

DP065880

DP065890

DP065900

DP065910

DP065920

DP065930

DP065940

DP065950

DP065960

DP065970

DP065980

DP065990

DP066000

DP066010

DP066020

DP066030

DP066040

DP066050

DP066060

DP066070

[illegible]

MOD	36	05/18/76	AN/BRN-7	CLA	121C	18	121E	71E1	STA	X0,,PPT	READ START ADDRESS OF SELECTED	DP067220
4080	*										"SUBROUTINE FROM TABLE AND WRITE	DP067230
4081	*										"INTO R14 PUSH DOWN STACK WHERE	DP067240
4082	*										"CALLING PROGRAM RETURN WAS.	DP067250
4083	*										"ENTER SUBROUTINE BY EXECUTING A	*S067260
4084	*										"8BK (SUBROUTINE RETURN) WHICH	DP067270
4085	*										"WILL RESTORE THE R14 POINTER TO	DP067280
4086	\$2										"ITS PROPER VALUE	DP067290
4087	*										"ADJUST R15 AND SEQUENCE TO CLEAR	CI067300
4088	*										"ADJUST R15 AND SEQUENCE TO CLEAR	DP067310
4089	*										"TURN OFF ACCEPT, INSERT AND	*H067320
4090	*										"TURN ON CLEAR	*H067330
4091	DISCLEAR										"DISPLAY LAMPS	*H067340
4092	EXT										"SWITCH MASK	DP067350
4093	ADDN										"TURN OFF ALL KEYBOARD LAMPS	067360
4094	CLAM										"AND CLEAR KEYBOARD IMAGE	067370
4095	SUBD											DP067380
4096	CLAM											DP067390
4097	STAD											DP067400
4098	STA											CI067410
4099	ENTER HERE TO BLANK DISPLAYS											*H067420
4100	AND LEGENDS AND SET MODE = 0											*H067430
4091	\$1											CI067440
4092	CLAM										"INITIALIZE WINDOWAD TO POINT TO	DP067450
4093	STA										"LEFT DISPLAY AND GUARANTEE THAT	DP067460
4094	CLSM										"NEXT DIGIT SEQUENCE WILL BE LEFT	DP067470
4095	CLAM										"NEXT DIGIT SEQUENCE WILL BE LEFT	DP067480
4096	STAD										"BLANK LEFT, RIGHT DISPLAYS AND	DP067490
4097	SUBD										"LEGENDS	DP067500
4098	CLAM										"SET MODE = 0 = QUIESCENT	DP067510
4099	STA											DP067520
4100	8BK											DP067530

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4101	1238	109C	PT1	CON	PANOUT	INPUT	CI067540
4101	123C	10A8	PT2	CON	PANOUT\$4	INPUT	CI067550
4102	1230	109D	PT3	CON	PANOUT\$1	INPUT	CI067560
4103			START_ACCEPT_GROUP;:				CI067570
4104			PT4	CON	OUTWAL	INPUT (SPECIAL)	CI067580
4104	123E	108F	PT5	CON	INSTWO		CI067590
4105	123F	119C	PT6	CON	INSTHREE	ACCEPT	CI067600
4106	1240	119E	PT7	CON	INSFIVE	ACCEPT	CI067610
4107	1241	11A2	PT8	CON	INSIX	ACCEPT	DP067620
4108	1242	11A4	PT9	CON	ENTEREW	ACCEPT	DP067630
4109	1243	11FE	PT10	CON	STAPAIR	ACCEPT	CI067640
4110	1244	11DD	PT11	CON	STAPAIR\$1	ACCEPT	CI067650
4111	1245	11DF	PT12	CON	ARGINPUT	ACCEPT	CI067660
4112	1246	120D	PT13	CON	INSFOUR	ACCEPT	CI067670
4113	1247	11A0	PPT	EQU	PANEL_PIN_TABLE-1		CI067680
4114	123A		ACCEPT_GROUP;				CI067690
4115			EQU				067700
4115							CI067710
4115							CI067720
4115							CI067730
	0004				START_ACCEPT_GROUP-PPT		

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4116	0000	* LABELS FOR PANEL PINS			CI067740
4117		* INPUT GROUP	0		CI067750
4117		CLEAR_PANEL EQU			CI067760
4118	0001	UPPER_LEFT_KEY;			CI067770
4118		UPPER_RIGHT_KEY;	PT 1-PPT		CI067780
4118		EQU			CI067790
4119	0002	LOWER_KEY EQU	PT 2-PPT		CI067800
4119	0003	WITH_ACCEPT_LIGHT;	PT 3-PPT		CI067810
4120					CI067820
4120	0004	* ACCEPT GROUP	PT 4-PPT	(SPECIAL)	CI067830
4121	0005	TWO_DIGITS EQU	PT 5-PPT		CI067840
4122		THREE_DIGITS;			CI067850
4122	0006	FIVE_DIGITS EQU	PT 6-PPT		DP067860
4123	0007	SIX_DIGITS EQU	PT 7-PPT		DP067870
4124	0008	EAST_OR_WEST;	PT 8-PPT		CI067880
4125					CI067890
4125	0009	LEFT_STATION_PAIR;	PT 9-PPT		CI067900
4126		EQU			CI067910
4126	000A	RIGHT_STATION_PAIR;	PT 10-PPT		CI067920
4127		EQU			CI067930
4127	000B	ARGUMENT EQU	PT 11-PPT		CI067940
4128	000C	FOUR_DIGITS EQU	PT 12-PPT		CI067950
4129	000D		PT 13-PPT		CI067960
					CI067970
					067980

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4130	SR	1248	F43A003E	PANELOUTPUT CLA	3,, PANEL_COUNT	"READ DISPLAY PANEL 10 COUNTER	DP067990
4131	12	124A	0066 (1251)	BRE	\$2	"IS IT TIME FOR A DISPLAY UPDATE?	*H068000
4132	2R	1248	9431	ADDM	3,, 1	"INCREMENT 10 COUNTER	*H068010
4133	10R	124C	F037003E	STA	3,, PANEL_COUNT	"SAVE 10 COUNTER	*H068020
						"	*H068030
						"DISPLAY PROGRAM COMPLETE"	*H068040
						"RETURN TO MAIN PANEL PROGRAM TO	*H068050
						"GENERATE STATUS DISPLAYS	DP068060
						"	DP068070
						"	DP068080
						"	DP068090
						"	DP068100
						"	DP068110
						"	DP068120
						"	DP068130
						"	DP068140
						"	DP068150
						"	DP068160
						"	DP068170
						"	068180
						"DOES THE OPERATOR HAVE THE HOLD	DP068190
						"MODE ON?"	DP068200
						"TRANSFER VARIABLES FOR DISPLAY	DP068210
						"SET PROGRAM FLAG C TO DEFINE	DP068220
						"NAVIGATION MODE	DP068230
						" TRUE = PHASE DIFFERENCE	DP068240
						" FALSE = RHO - RHO	DP068250
						"	DP068260
						"SUB ALWAYS PHASE DIFFERENCE	DP068270
						"	*H068280
						"	*H068290
						"	*H068300
						"	*H068310
						"	*H068320
						"	*H068330
						"	*H068340
						"	*H068350
						"	*H068360
						"	*H068370
						"	*H068380
						"	*H068390
						"	*H068400
						"SELECT DISPLAY SUBROUTINE"	*I068410

4142	22 *	125A	F8001263	MOD 36	05/18/76	AN/BRN-7	BSV	IXO, \$4	"FROM DISPLAY TABLE"	PAGE 196
								* THE GENERATION OF THE DISPLAY		DP068420
								* IS NOW COMPLETE AND THE DATA		*H068430
								* IS READY FOR OUTPUT		*H068440
4143	24	125C	9C63				CLAM	6,, C, LEFT_DISPLAY		*H068450
4144	36	125D	7060				PTRD	"OUTPUT LEFT DISPLAY		DP068460
4145	44	125E	7544				PTR	"		DP068470
4146	56	125F	7032				PTRD	"		DP068480
4147	64	1260	7515				PTR	"		DP068490
								"		DP068500
								"		DP068510
								"		*H068520
								"		*H068530
								"		*H068540
4148	2R	1261	8C39				CLSM	3,, 9		DP068550
4149	6	1262	D907				BUC	\$1		DP068560
								"		DP068570
4150		1263	146A				CON	POPI1		068580
4151		1264	1293				CON	POP2		DP068590
4152		1265	12C2				CON	POP4		068600
4153		1266	1420				CON	POP12		068610
4154		1267	12CE				CON	POP7		068620
4155		1268	1386				CON	POP9		068630
4156		1269	1309				CON	POP5		068640
4157		126A	148B				CON	POP14		068650
4158		126B	145F				CON	POP10		068660
4159		126C	1458				CON	POP15		068670
4160		126D	12C9				CON	POP6		068680
4161		126E	1270				CON	POP1		068690
4162		126F	12E2				CON	POP3		068700

"RESET PANEL COUNT TO 10 TO
"DELAY ANOTHER SECOND

INPUTS
SYNC
POS VAR
N COUNTER
CSE-ETE
D-GMT
LOP
CAL H/S (GS-TK)
MAN-H/S
AUTO H/S
8GR/RWG
POSITION SHIP 0-9 RZ
CON

4163	2R	1270 5818	POPI	COMM	1,11	"EXAMINE ARG1	DP068710
4164	6	1271 0068 (127A)	BRE	\$2	"SHIP		DP068720
							DP068730
							068740
4165	2R	1272 8411	ADD	1,1	DOUBLE DESTINATION INDEX		DP068750
4166	14R	1273 F91C1FC4			"READ LONGITUDE		DP068760
4167	590	1275 0C02	\$118	2FETD	X1, DESTINATION_LONGITUDE		DP068770
4168	14R	1276 F94C1FDE			"CONVERT LONGITUDE FOR DISPLAY		DP068780
4169	590	1278 0C01			LONGITUDE_DISPLAY "AND SET UP LEGEND"		\$ 068790
4170	598	1279 05F0	\$119	2FETD	X4, DESTINATION_LATITUDE		DP068800
4171	8R	127A F4081F55			"READ LATITUDE		DP068810
4172	8R *	127C F80D14A7			"CONVERT LATITUDE FOR DISPLAY		\$ 068830
4173	12	127E AC60			LATITUDE_DISPLAY "AND SET UP LEGEND"		DP068840
4174	22	127F 0710			"RETURN TO MAIN DISPLAY ROUTINE		DP068850
4175	598	1280 0C02	\$2	FETM	0, RIJ_STAR		DP068860
4176	606	1281 C016			"READ POINTER TO R1 VECTOR		DP068870
4177	1182	1282 0C01	\$21	BSV	"CONVERT POSITION VECTOR TO		DP068880
4178	1190	1283 05F0		CLAD	"LATITUDE AND LONGITUDE		DP068890
4179		1273		PRN			\$ 068910
4180		1276					\$ 068920
4181	14R	1284 F80C002E			"CONVERT LONGITUDE FOR DISPLAY		DP068930
4182	16	1286 A421			LONGITUDE_DISPLAY "AND SET UP LEGEND		\$ 068950
4183	26	1287 F8050080					DP068960
4184	32	1289 F0150080			LATITUDE_DISPLAY "AND SET UP LEGEND		DP068970
4185	36	1288 F4240100			"RETURN TO MAIN DISPLAY ROUTINE		DP068980
4186	38	1280 8402	POPI\$118				PT068990
4187	52	128E FC070008	POPI\$119				PT069000
4188	62	1290 8420					069010
4189	70	1291 52E8 (00E8)			STATUS_FAIL_FETD		069020
4190	74	1292 D20C (128F)			CLA		069030
					2,1		069040
					0, 8		069050
					1, 8		069060
					2, 8		069070
					0, 2		069080
					0, C_UPPER_LEFT_KEYBOARD_LAMPS		069090
					2, 0		069100
					0, -DX(1)		069110
					BLANKS_GEN		

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DP069120
*H069130

4191	2R	1293	9021	POP2	* ENTER HERE FOR STATUS DISPLAY	2,1	"TEST ARGWORD2	DP069140
4192	6	1294	0951			STATUS_FAIL		069150
4193	2R	1295	9823			2,3		069160
4194	8	1296	040312EQ			STATUS_CCOH		069170
4195	30R	1298	F05C1ED3			5, Q_STORAGE	"READ DATA FOR SYNC PERCENT	069180
4196	36	129A	9E1A (009A)	*			"COMPLETION_DISPLAY	DP069190
4197	40	1298	D164 (1280)	*		0, CALIBRATE_E	"COMPUTED_MARKER	DP069200
4198	2R	129C	A447				"IS THE SYNC	*1069210
4199	6	129D	4448			4,7	"PROCESS GOING ON NOW?	DP069220
4200	8	129E	A454			4,7	"CONVERT FREQ NUMBER IN ARG1 TO	*H069230
4201	10	129F	9457			4,8	"INDEX FOR READING THE 8 Q BURSTS	DP069240
4202	14	12A0	8822			5,4	"FOR 1 FREQUENCY	DP069260
4203	8R	12A1	F54A1ED3	\$3		5,7	"CLEAR DOUBLE REGISTER FOR DIGITS	DP069270
4204	12	12A3	4402			2,2	"READ 1 Q BURST SCALED B1	DP069280
4205	16	12A4	D022 (12A7)			X4, Q_STORAGE	"READ 1 Q BURST SCALED B1	DP069290
4206	2R	12A5	9C09			0,1	"IS THIS Q GREATER THAN 1?	DP069300
4207	6	12A6	D002 (12A9)			\$1	"SET DISPLAY DIGIT TO A 9 WHICH	2R069310
4208	446R	12A7	1000	\$1		\$1	"IS THE MAXIMUM DISPLAY	DP069320
				*		0	"FORM 9 * Q**5 AT B15	DP069330
				*			"THIS WILL GIVE A NUMBER FROM	DP069340
				*			"0 TO 8 IN THE LSB'S OF THE	DP069350
				*			"WORD WHICH IS ALMOST	DP069360
				*			"EQUAL TO THE TENTH'S PLACE	DP069370
				*			"OF Q**5	DP069380
4209	452	12A8	5009			0,9	"SHIFT DISPLAY OVER 1 DIGIT	DP069390
4210	8R	12A9	FC240010	\$2		2,4	"ADD IN THE NEXT DIGIT	DP069400
4211	8	12A8	B430			3,0	"ARE THERE MORE	DP069410
4212	16	12AC	C44C (12A1)	*		4,3	"Q'S FOR THIS FREQUENCY?"	*1069420
4213	2R	12AD	A402			0,2	"SET UP THE 8 DIGITS TO DISPLAY	DP069430
				*			"IN THE 4 LEFT DIGITS OF EACH	DP069440
				*			"REGISTER	DP069450
4214	4	12AE	8C11			1,1	"BLANK THE REMAINING DIGITS OF	DP069460
4215	8	12AF	D008 (128B)			\$10	"THE LEFT DISPLAY REGISTER	DP069470
4216	4R	1280	AC04	\$4		0,4	"DURING SYNC Q STORAGE + 2	DP069480
				*			"CONTAINS DELTA C - CD WHERE	DP069490
				*			"DELTA C = C(LARGEST) - C(2ND	DP069500
				*			"LARGEST) WITH THE 2 C'S NOT	DP069510
				*			"ADJACENT. Q STORAGE + 4 CON-	DP069520
				*			"TAINS CD	DP069530
				*				DP069540

Address	Offset	Operation	Comments	Destination
4217	8	1281 8C02	ADDD	0,2
4218	12	1282 D061 (1284)	BRE	\$20
4219	126R	1283 DC04	DIVD	0,4
4220	10R	1284 480A	MPYDM	0,10
4221	16	1285 F0155000	MPLM	1,X(15000)
4222	26	1287 F8040800	RSAD	0,4
4223	28	1289 8C01	CLSM	0,1
4224	30	128A 8C31	CLSM	3,1
4225	2R	128B 8C41	CLSM	4,1
4226	4	128C B055	SUB	5,5
4227	6	128D B022	SUB	2,2
4228	14	128E D5F0	BBK	15
4229	10R	128F 8420	BLANKS_GEN FETM	2,0
4230	18	12C0 92E8 (00E8)	SUBD	0,1
4231	26	12C1 D5F0	BBK	15
4232	14R	12C2 F80C1F96	FETO	0, SAVE_POSITION_VARIANCES
4233	24	12C4 FC0B1F98	ADDD	0, SAVE_POSITION_VARIANCES+2
4234	470	12C6 1000	SQRT	0

* * * THIS ROUTINE WILL BLANK ONE REGISTER AND LEGEND AND RETURN

* * * CREATE 3 REGISTERS FOR THE

* * * DISPLAY

* * * ZERO THE LEGEND

* * * BLANK THE DISPLAY REGISTER

* * * ENTER HERE FOR POS VAR

* * * POP4

* * * COMPUTE (P11 + P22)*.5

* * * CONVERT POS VAR FOR DISPLAY

* * * FORM DELTA C

* * * IS THE 1ST SYNC

* * * 10 SEC PERIOD COMPETE YET?

* * * (DELTA C NOT 0)

* * * COMPUTE DELTA C / CD

* * * WHICH EQUALS PERCENTAGE / 100

* * * FORM PERCENTAGE * 10/2**15 TO

* * * GIVE THE TENS DIGIT IN THE LOW

* * * BITS OF THE LEFT HALF OF A 32

* * * BIT REGISTER

* * * FORM REMAINDER * 10/2**4 (IGNORED)

* * * THE SIGN BIT IN THIS OPERATION

* * * TO GIVE THE ONES DIGIT IN THE

* * * MSB'S OF THE RIGHT HALF OF THE

* * * 32 BIT REGISTER

* * * SHIFT THE DOUBLE REGISTER RIGHT

* * * ONE CHARACTER TO ALIGN THE

* * * DIGITS WITH THE 2 LOW DIGITS OF

* * * THE LEFT DISPLAY REGISTER

* * * BLANK THE 4 HIGH CHARACTERS OF

* * * THE LEFT AND RIGHT DISPLAYS

* * * BLANK THE 2 LOW DIGITS IN THE

* * * RIGHT DISPLAY

* * * CLEAR BOTH LEGENDS

* * * RETURN TO MAIN DISPLAY ROUTINE

* * * BLANKS

* * * THIS ROUTINE WILL BLANK ONE REGISTER AND LEGEND AND RETURN

* * * BLANKS_GEN FETM 2,0

* * * SUBD 0,1

* * * BBK 15

* * * ENTER HERE FOR POS VAR

* * * POP4

* * * FETO 0, SAVE_POSITION_VARIANCES

* * * ADDD 0, SAVE_POSITION_VARIANCES+2

* * * SQRT 0

* * * COMPUTE (P11 + P22)*.5

* * * CONVERT POS VAR FOR DISPLAY

4235	1046	12C7	0C07	MOD 36	05/18/76	AN/BRN-7	SIG_DISPLAY	"IN NAUTICAL MILES	PAGE 200
4236	1050	12C8	080A (128F)	*	GEN	BLANKS_GEN	"BLANK THE LEFT DISPLAY	DP069980	
				*	BUC	"ENTER HERE FOR RANGE AND BEARING	"RETURN TO MAIN DISPLAY ROUTINE	DP069990	
				*	POP6	"RANGE START POINT IS IN ARG1		DP070000	
				*	BSV	"RANGE END POINT IS IN ARG2		DP070010	
4237	8R *	12C9	F80D1483		GEN	MAKE_RANGE_AND_BEARING	"COMPUTE AND CONVERT BEARING	DP070020	
4238	584	12C8	0C04		BUC	RANGE_DISPLAY	"COMPUTE RANGE"	DP070030	
4239	590	12CC	04001441		POP7	SWAP	"CONVERT RANGE FOR DISPLAY	DP070040	
4240	2R	12CE	A421	*	CLA	2,1	"INTERCHANGE LEFT & RIGHT	DP070050	
				*	CLAM	1,11	"MOVE ARG1 TO ARG2 AND SET CRAFT	DP070060	
4241	4	12CF	9C18	*	BSV	FETD	"IN ARG1 TO GET RANGE AND BEARING	DP070070	
4242	12 *	12D0	F80D1483		MPYD	2,1	"FROM CRAFT TO SELECTED	DP070080	
4243	26	12D2	F80C1F4E		CLAD	2,0	"DESTINATION	DP070090	
4244	34 *	12D4	F80D1751		CLAD	2,0	"COMPUTE AND CONVERT BEARING	DP070100	
4245	54	12D6	F8261AD2		CLAD	2,0	"COMPUTE RANGE"	DP070110	
4246	58	12D8	8820		CLAD	2,0	"COMPUTE CRAFT SPEED FROM	DP070120	
4247	62	12D9	0051 (1208)		CLAD	2,0	"VC2 AND VC3"	DP070130	
4248	4R	12DA	AC20		CLAD	2,0	"DIVIDE RANGE BY 100 HOURS	DP070140	
					CLAD	2,0	"MINIMUM DISPLAY) TO GET MINIMUM	DP070150	
4249	126R	12DB	0C20		CLAD	2,0	"ACCEPTABLE VELOCITY	DP070160	
4250	136	12DC	0710		CLAD	2,0	"IS THE VELOCITY HIGH ENOUGH?	DP070170	
4251	576R	12DD	0C06		CLAD	2,0	"TOO SLOW"	DP070180	
4252	582	12DE	04001441		CLAD	2,0	"SET RANGE = VEL TO GET 100 HR	DP070190	
					CLAD	2,0	"COMPUTE TIME TO GO	DP070200	
					CLAD	2,0	"RANGE / VELOCITY	DP070210	
					CLAD	2,0	"CONVERT EYE FOR DISPLAY	DP070220	
					CLAD	2,0	"EXCHANGE	DP070230	
					CLAD	2,0		DP070240	
					CLAD	2,0		DP070250	
					CLAD	2,0		DP070260	
					CLAD	2,0		DP070270	

MOD	36	05/18/76	AN/BRN-7	DISCARD LANE COUNT	SAVE IN SCRATCH STORAGE	ARE THERE MORE	FREQUENCIES TO PROCESS?	SET UP ANGLES IN STORAGE IN	ORDER OF DISPLAY EACH WILL BE	DISPLAYED IN 2 DIGITS ON PANEL	STATION NUMBER	STATION - BASE	GET THETA	LAMBDA TABLE	PP THETA 2	PP THETA 2	LAMBDA CONSTANT TABLE	CHART VALUE	REMOVE LANE COUNT	INCREASE STACK POINTER	10.2	SAVE 10.2	13.6	13 IN FIRST SLOT FROM RIGHT	ON DISPLAY	11 IN SECOND
4289	24	1311	FC040800	LSAD	0,,11																					
4290	32	1313	734F	STA	IX4,15																					
4291	34	1314	9481	ADDM	8,,1																					
4292	36	1315	9491	ADDM	9,,1																					
4293	44	1316	CD4C	BXUD	4,,\$1																					
4294	8R	1317	ADF0	CLAD	X15,,0																					
4295	18	1318	79F6	STAD	X15,,6																					
4296	20	1319	94F2	ADDM	15,,2																					
4297	24	131A	D3B1	88F	\$6																					
4298	8R	1318	F49A1F41	CLA	9,,ARGWDRO1																					
4299	16	131D	F48A0CCC	CLA	8,,BASE+1																					
4300	18	131F	A409	CLA	0,9																					
4301	22	1320	FC191F55	CLAM	1,,RIJ_STAR																					
4302	30	1322	F80D0862	BSV	COMPUTE_THETA1																					
4303	34	1324	AC20	CLAD	2,0																					
4304	38	1325	D0D6	BCF	\$7																					
4305	2R	1326	A408	CLA	0,8																					
4306	6	1327	FC191F55	CLAM	1,,RIJ_STAR																					
4307	14	1329	F80D0862	BSV	COMPUTE_THETA1																					
4308	18	1328	882Q	SUBC	2,0																					
4309	4R	132C	AC02	CLAD	0,2																					
4310	24	132D	F94616B2	MPYD	X4,,LAMBDA_TABLE																					
4311	44	132F	F8061AC4	MPYD	0,,=DF(3.141592658-2)																					

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4331	52	1349	AC06	CLAD	0,6	10 IN THIRD	071140
4332	62	134A	79FA	STAD	X15,,10		071150
4333	66	134B	D009	BUC	\$2-1		071160
4334	8R	134C	ADF0	CLAD	X15,,0		071170
4335	16	134D	89F4	SUBD	X15,,4	"REGISTERS	DP071180
4336	26	134E	79F6	STAD	X15,,6	"ORDER = 13.6, 11.3, 10.2,	DP071190
4337	34	134F	ADF0	CLAD	X15,,0	"13.6 - 10.2, 13.6 - 11.3,	DP071200
4338	42	1350	89F2	SUBD	X15,,2	"11.3 - 10.2	DP071210
4339	52	1351	79F8	STAD	X15,,8	"	DP071220
4340	60	1352	ADF2	CLAD	X15,,2	"SET UP COUNTER TO CYCLE THE	DP071230
4341	68	1353	89F4	SUBD	X15,,4	"6 DISPLAYS	DP071240
4342	78	1354	79FA	STAD	X15,,10	"RELEASE 2 OF THE SCRATCH WORDS	DP071250
4343	80	1355	9C5A	CLAM	5,,10		DP071260
4344	6R	1356	A74F	CLA	IX4,,15	"READ WORD INTO UPPER HALF OF A	DP071270
4345	8	1357	9C10	CLAM	1,,0	"32 BIT REGISTER	DP071280
4346	16	1358	5C0A	MIEDM	0,,10	"MULTIPLY END AROUND BY 10 TO GET	DP071290
4347	22	1359	5005	MPLM	0,,5	"TENTHS OF CYCLE IN LSB'S OF	DP071300
4348	28	135A	FC041000	LSAD	0,,12	"SECOND HALF OF WORD	DP071310
						"MULTIPLY FIRST HALF BY 10/2**16	DP071320
						"TO GET THE HUNDRETHS DIGIT IN	DP071330
						"THE LSB'S OF THE FIRST HALF	DP071340
						"SHIFT BOTH DIGITS LEFT TO THE	DP071350
						"MSB'S	DP071360
4349	38	135C	7B4F	STAD	IX4,,15	"SAVE IN SCRATCH WORD	DP071370
						"ARE THERE MORE	*1071380
4350	46	135D	CC48	BXUD	4,,52	"WORDS TO CONVERT?"	DP071390
4351	2R	135E	9C65	CLAM	6,,5	"SET UP 6 COUNTER TO PACK THE 6	DP071400
4352	4	135F	9C50	CLAM	5,,0	"DIGITS OF ONE DISPLAY REGISTER	DP071410
						"PACK DIGITS OF 1ST 3 WORDS FOR	*1071420
4353	12 *	1360	F80D1364	BSV	\$3	"THE LEFT DISPLAY REGISTER	DP071430
4354	16	1362	AC30	CLAD	3,0	"MOVE DATA FROM LEFT DISPLAY TO	DP071440
4355	18	1363	9C20	CLAM	2,,0	"THE RIGHT DISPLAY	DP071450
4356	10R	1364	F8050800	RSLO	0,,4	"SHIFT DOUBLE WORD RIGHT 1 DIGIT	DP071460
4357	16	1366	B75F	ADD	IX5,,15	"ADD 1 DIGIT TO THE DISPLAY FROM	DP071470
						"SCRATCH STORAGE	DP071480
						"ARE THERE MORE	*1071490
4358	24	1367	C454	BXU	5,,53	"DIGITS TO ADD TO THE DISPLAY	DP071500
						"RETURN AND RELEASE 6 SCRATCH	DP071510
						"AFTER SECOND ENTRY ALL DATA IS	DP071520
						"SET UP FOR DISPLAY AND THE	DP071530
						"RETURN GOES TO MAIN DISPLAY	DP071540
4359	8R	1368	D5F6			"ROUTINE	DP071550
							*1071560

* BASE STATION TRACKING FILTER DISPLAY

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4360 4R 1369 4406 136A F4091E43 0,16 "COMPUTE POINTER TO PHI ESTIMATE DP071570

4361 8 136A F4091E43 0,16 "CREATE REGISTERS FOR LEFT/RIGHT DP071580

4362 24 136C 8450 FETM 5,10 "DISPLAY AND LEGENDS DP071590

4363 32 136D 8414 FETM 1,14 "SET UP A 3 COUNTER FOR 3 FREQ DP071600

4364 12R 136E CB08 FETD IX0,6 "READ PHI ESTIMATE DP071610

4365 20 * 136F F80D1373 8SV \$21 "CONVERT AND POSITION 4 DIGITS *1071620

4366 28 1371 CC04 (136E) 8XU0 0,18 "ARE THERE MORE DP071640

4367 14R 1372 D510 8BK 1 "FREQUENCIES TO PROCESS?" DP071650

4368 6R 1373 FC040400 LSAD 0,10 "RETURN TO MAIN DISPLAY ROUTINE DP071660

4369 10 1375 D021 (1377) BGE \$23 "DELETE LANE COUNT DP071720

4370 6R 1376 5664 (00E4) ADD \$23 "SCALE CYCLES / 10 SECONDS DP071730

4371 576R 1377 OC08 GEN 0,18 "IS THE RESULT NEGATIVE DP071740

4372 578 1378 5832 BGE 3,12 "ADD 1 CYCLE TO FORCE POSITIVE DP071750

4373 582 1379 D024 (137E) COMM \$24 "CONVERT FOR DISPLAY (4 DIGITS) DP071760

4374 6R 137A FC040100 LSAD 0,18 "IS THIS 10.2?" DP071770

4375 8 137C A450 CLA 5,0 "SHIFT DISPLAY OVER 2 DIGITS AND DP071780

4376 24 137D D520 8BK 2 "PLACE IN LEFT 4 DIGITS OF LEFT DP071800

4377 4R 137E D035 (1384) BRG \$25 "IS THIS 13.6?" DP071810

4378 4R 137F F4040100 LSA 0,18 "MGVE 2 HIGH ORDER DIGITS TO LOW DP071820

4379 6 1381 8481 ADD 8,1 "DIGITS OF LEFT DISPLAY AND 2 LOW DP071830

4380 8 1382 8460 ADD 6,0 "ORDER DIGITS TO THE 2 HIGH ORDER DP071850

4381 24 1383 D520 8BK 2 "DIGITS OF THE RIGHT DISPLAY DP071860

4382 4R 1384 8C80 A000 8,0 "11.3" DP071870

4383 20 1385 D520 8BK 2 "PLACE THE 4 DIGITS INTO THE 4 DP071880

"LOW DIGITS OF THE RIGHT DISPLAY DP071890

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DP071900
#H071910
DP071920
071930
071940
DP071950
DP071960
DP071970
071980
DP071990
HH072000
072010
072020
072030
DP072040
DP072050
DP072060
DP072070
DP072080
DP072090
072100
072110
072120
072130
072140
072150
072160
072170
072180
072190
072200
072210
072220
072230
072240
072250
072260
072270
072280
072290
072300
072310
072320

** ENTER HERE FOR D-GMT DISPLAY
POP9
5.0
6.0=DF(((50-3831)/24)/3600)/(1811)
8.0 DAY SINCE JAN 1 1972
1.0 TIME STAR
1.6 CONVERT TO DAYS
1.8
1.0=DF(((5)/86400811) ROUND DISPLAY TO NEAREST S
6.1 SAVE FOR DATE DISPLAY
6.4 RESCALE DAYS TO B15
1.1, HX000F REMOVE INTEGER PART
1.3 CONVERT TO HOURS AT B15
1.1
\$7 MAKE TWO BCD
1.60 MINUTES
1.60 SECONDS
\$7
DT+FOR+D
4.365
1.3
2.11
2.4
\$2
\$11
2.4
3.1
2.4
\$2
0.1
2.1
\$10
0.0
\$3
2.59
\$3
E+0
\$3
2.1
1
1.72

* PROCESS DATE
FLG
FETM
CLAM
CLA
COM
BLE
BUC
SUB
ADD
COM
BLE
BXU
SUBM
BUC
COM
BNE
COM
BRG
FLG
BRE
ADD
PRN
ADD

1386 8450
1387 FC6A00E7
1389 FC8A00C4
1388 FC1A1F4C
1380 6816
138E 8C18
138F FC181A92
1391 A461
1392 F065080C
1394 E411177D
1396 4C13
1397 F8154000
1399 F80D1302
1398 FC14003C
139D F80D1302
139F FC14003C
13A1 F80D1302

13A3 DEEF
13A4 F448016D
13A6 9C13
13A7 A428
13A8 8024
13A9 0048 (1382)
13AA D004 (13AF)
13AB 8024
13AC 9431
13AD 8024
13AE 0043 (1382)
13AF C405 (13AB)
13B0 9021
13B1 D807 (13AB)
13B2 9800
13B3 D016 (138A)
13B4 F8290038
13B6 D033 (138A)
13B7 DE63
13B8 0061 (138A)
13B9 9421
13BA 0710
13BB F4190048

4384 16R
4385 26
4386 36
4387 10R
4388 26
4389 30
4390 40
4391 42
4392 48
4393 56
4394 62
4395 72
4396 80
4397 6R
4398 14
4399 20
4400 28
4401 30
4402 46
4403 48
4404 50
4405 52
4406 56
4407 4R
4408 2R
4409 4
4410 6
4411 10
4412 8R
4413 2R
4414 6
4415 2R
4416 6
4417 4R
4418 8
4419 2R
4420 6
4421 2R
4422 10R
4423 14

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4445	2R	1309	B411	POP5	ADD	1,1	"SAVE FREQUENCY IDENTIFIER	DP072550
4446	12	130A	F0171F3C	STA	STA	1,1	"FROM ARG1	DP072560
4447	20	130C	F80D13E9	BSV	BSV	PROCESS_RIGHT_PAIR	"COMPUTE LOP FOR RIGHT STATION	DP072570
4448	28	130E	F80D13E2	BSV	BSV	\$1	"PAIR"	DP072580
4449	36	130F	F80D13EC	BSV	BSV	PROCESS_LEFT_PAIR	"PAIR"	DP072590
4450	10R	13E2	F8044000	RSAD	RSAD	0,1	"RESCALE LOP TO CYCLES B11 AND	DP072600
4451	14	13E4	F4053840	ADD	ADD	0,1	"ADD 900 CYCLE OFFSET	DP072610
4452	590	13E6	0C03	GEN	GEN	LOP_DISPLAY	"CONVERT LOP FOR DISPLAY	DP072620
4453	594	13E7	AC40	CLAD	CLAD	4,0	"MOVE DATA INTO PROPER REGISTERS	DP072630
4454	612	13E8	D530	8BK	8BK	3	"FOR DISPLAY	DP072640
							"ADD DOT TO LEGEND	DP072650
							"EXIT"	DP072660
							"1ST TIME RETURNS TO LOP DISPLAY	DP072670
							"2ND TIME RETURNS TO MAIN DISPLAY	DP072680
							"COMPUTE LOP	DP072690
							"THIS ROUTINE WILL COMPUTE THE LOP FOR THE STATION PAIR DISPLAYED IN	DP072700
							"THE LEFT OR RIGHT LEGEND	DP072710
							"ENTER HERE FOR RIGHT DISPLAY	DP072720
							PROCESS_RIGHT_PAIR;	DP072730
							FET	DP072740
							BUC	DP072750
							"ENTER HERE FOR LEFT DISPLAY	DP072760
							PROCESS_LEFT_PAIR;	DP072770
							FET	DP072780
							"ALLSTATIONS	DP072790
							"READ RIGHT LEGEND	DP072800
							"ADJUST ASCII FOR INDEXING	DP072810
							P,P,P	DP072820
							N1,N2,P	DP072830
							N1=0-7X2**6 N2=0-7	DP072840
							MOVE N1 INTO	DP072850
							N1,N2,P	DP072860
							DISPLAY POSITION	DP072870
							N2,N1,N2,N1,N2,P	DP072880
							FIND LARGEST STATION NUMBER	DP072890
							"READ LEFT LEGEND	DP072900
							ADJUST ASCII FOR INDEXING	DP072910
							P,P,P	DP072920
							N1,N2,P	DP072930
							N1,N2,P	DP072940
							DISPLAY POSITION	DP072950
							N2,N1,N2,N1,N2,P	DP072960
							FIND LARGEST STATION NUMBER	DP072970

[illegible]

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4493	10R	1418	FD1A1EA3	CLAC	X1, PHI_ESTIMATE "FORM LOP = PHI EST (1)	DP073410	
4494	20	141D	F92B1EA3	SUBO	X2, PHI_ESTIMATE "	DP073420	
4495	24	141F	00C1 (1421)	BCT	\$11 CORRECT IF PHASE DIFF	11 DP073430	
4496	BR	1420	05FQ	BBK	15	11 DP073440	
4497	14R	1421	FOIC1F3C	FET	1, PHI_OFFSET GET FREQ	11 073450	
4498	16	1423	A440	CLA	4,0 SAVE FOR N1	11 073460	
4499	18	1424	A416	CLA	1,6 N2	11 073470	
4500	26 *	1425	F80D0C05	BSV	D_PHI_K1	11 073480	
4501	30	1427	BC20	A0DD	2,0 LOP + N2 CORR	11 073490	
4502	34	1428	AC04	CLAD	0,4	11 073500	
4503	42 *	1429	F80D0C05	BSV	D_PHI_K1	11 073510	
4504	46	1428	B820	SUBD	2,0 LOP + N2 - N1 CORR	11 073520	
4505	60	142C	0510	BBK	1	11 073530	

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**
* ENTER HERE FOR NCTR DISPLAY
POPL2
142D 84A0
142E A48C
142F 4486
1430 44C3
1431 F4C91D88
1433 F80D1459
1435 F80D1444
1437 AC53
1438 8833
1439 F80D1444
143B FC340100
143D AC83
143E F80D1444
1440 FC340100
1442 AC93
1443 D540
1444 A60C
1445 E4C0177D
1447 F4040010
1449 B440
144A FDBA1E23
144C 1000
144D F8040064
144F 96F1 (00F1)
1450 9809
1451 D051 (1453)
1453
26R
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48 *
56 *
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72 *
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90 *
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100
120
126R
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* COMPUTE POINTERS FOR THE 32 BIT
 * SIGMA SQ PHI PHI AND THE 16 BIT
 * SIGMA SQ N COUNTER FOR THIS
 * STATION (ARG1)
 * COUNTER
 * READ AND CONVERT THE 2 DIGIT
 * KALMAN DUMPS FOR 10.2
 * GET SIGMA AND N FOR 10.2 (2 DIG-
 * ITS) AND K DUMPS FOR 13.6 (2)
 * SET UP FIRST 6 DIGITS FOR THE
 * LEFT DISPLAY REGISTER
 * GET SIGMA AND N FOR 13.6 (2 DIG-
 * ITS) AND K DUMPS FOR 11-3 (2)
 * SET UP THESE 4 DIGITS FOR THE 4
 * HIGH ORDER DIGITS OF THE RIGHT
 * DISPLAY
 * GET SIGMA AND N FOR 11-3 (2 DIG-
 * ITS) - IGNORE REMAINING 2 DIGITS
 * PLACE LAST 2 DIGITS INTO THE LOW
 * DIGITS OF THE RIGHT DISPLAY
 * RETURN TO MAIN DISPLAY ROUTINE
 * CONVERT N, KALMAN DUMPS AND VARIANCE
 * THIS ROUTINE IS USED BY THE NCTR DISPLAY ROUTINE TO GET THE N COUNTS,
 * KALMAN DUMPS AND SQUARE ROOT OF THE TRACKING FILTER VARIANCE. THE
 * ARGUMENTS CONSIST OF POINTERS TO N COUNT AND SIGMA. THE OUTPUT DIGITS
 * ARE LEFT IN THE 6 MOST SIGNIFICANT DIGITS OF A 32 BIT REGISTER.
 * READ AND EXTRACT THE 1 DIGIT N
 * COUNT (N NEVER EXCEEDS 7)
 * PLACE DIGIT IN 2ND POSITION OF
 * THE 32 BIT REGISTER
 * COMPUTE SQUARE ROOT OF SIGMA SQ
 * PHI PHI + .005 CYCLE
 * SCALED .01815
 * IS THE RESULT
 * GREATER THAN .08 CYCLES?"

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4532 2R 1452 9C09 CLAM 0,,9 "SET DISPLAY DIGIT TO 9 FOR MAX DP073970
 4533 2R 1453 8440 ADD 4,,0 "STANDARD DEVIATION DP073980
 4534 8 1454 FC340100 LSAD 3,,8 "ADD STANDARD DEVIATION DIGIT DP073990
 "TO THE LOW DIGIT OF THE 32 BIT DP074000
 4535 10 1456 9482 ADDM 11,,2 "REGISTER AND SHIFT REGISTER LEFT DP074010
 4536 12 1457 8011 SUB 1,,1 "2 DIGITS DP074020
 4537 14 1458 94C1 ADDM 12,,1 "INCREMENT POINTERS TO N AND \$S074030
 "SIGMA FOR THE NEXT FREQUENCY DP074040
 INCREMENT N C7 ADDRESS NC074050
 * ENTER HERE FOR KALMAN DUMPS ONLY *H074060
 4538 6R 1459 A62C CLA 12,12 "GET 8 BIT KALMAN DUMP COUNT DP074070
 " (NEVER EXCEEDS 99) FROM N COUNT DP074080
 4539 12 145A FC140100 LSAD 1,,8 "WORD DP074090
 4540 20 * 145C F80D13D2 BSV POP0\$7 "CONVERT DUMPS TO BCD AND SHIFT *I074100
 4541 28 145E 05F0 B8K 15 "INTQ 32 BIT REGISTER DP074110
 "EXIT" DP074120
 * ENTER HERE FOR MAN V/H * NC074130
 4542 2R 145F 981C POP10 1,,12 SHIP OR RZ *H074140
 4543 6 1460 D168 (147C) BRE RZ 074150
 4544 14R 1461 F80C1F88 FETO 0,,PSI_INSERT "READ INSERTED HEADING 074160
 590 1463 0C00 GEN BEARING_DISPLAY "CONVERT HEADING FOR DISPLAY DP074180
 4546 604 1464 F80C1FF4 FETO 0,,V_INSERT "READ INSERTED VELOCITY DP074190
 4547 606 1466 9C10 CLAM 1,,0 " SCALE AT 812 FT/SEC DP074200
 4548 614 1467 4263 MPY 0,,HX4000 DP074210
 4549 1190 1468 0C05 GEN SPEED_DISPLAY "CONVERT VELOCITY FOR DISPLAY DP074220
 1194 1469 D307 BUC SWAP 074230
 * ENTER HERE FOR OMEGA - DR *H074240
 4551 6R 146A 9E65 (00E5) POP11 CLA 0,,STATIONS_IN_USE "READ OMEGA STATIONS AND NAV DP074250
 "MODE SELECTED BY THE OPERATOR DP074260
 * * * * * "AND DISPLAY IN THE UPPER RIGHT DP074270
 * * * * * "KEYBOARD LAMPS DP074280
 4552 8R 1468 E420010F EXT 2,0,HX00FF 074290
 4553 10 1460 8422 ADD 2,2 074300
 4554 18 146E E41000DF EXT 1,0,HX0400 GET AUTO BIT FOR UL 074310
 4555 26 1470 E40000DE EXT 0,0,HX0200 GET MAN BIT FOR UR 074320
 4556 28 1472 8420 ADD 2,0 074330
 4557 34 1473 9E4C (00CC) CLA 0,,BASE+1 "READ LAMP BIT CORRESPONDING TO \$S074340
 "THE BASE STATION NUMBER AND DP074350
 "DISPLAY IN THE UPPER LEFT DP074360
 * * * * * "KEYBOARD LAMPS DP074370
 4558 42 1474 F50A0006 CLA X0,,POWERS_OF_TWO+1 074380
 4559 44 1476 8410 ADD 1,0 074390

[illegible]

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074830
074840
074850
074860
074870

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CLAD 4.7
CLA 3.6
CLAD 7.1
CLA 6.0
88K 2

14A2 AC47
14A3 A436
14A4 AC71
14A5 A460
14A6 D520

14
16
20
22
38

4590
4591
4592
4593
4594

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PAGE 214
DP074880
*H074890
*H074900
*H074910
*H074920
*H074930
DP074940
DP074950
DP074960
DP074970
DP074980
DP074990
DP075000
DP075010
DP075020
DP075030
DP075040
DP075050
DP075060
DP075070
DP075080
DP075090

MAKE LAT LONG

* THIS ROUTINE WILL COMPUTE LATITUDE AND LONGITUDE FROM A POSITION
* VECTOR. THE ARGUMENT CONSISTS OF A POINTER TO THE VECTOR

* ENTER WITH ADDRESS OF V IN R0:

* V1 = SIN LAT, V2 = COS LAT, COS LONG, V3 = COS LAT, SIN LONG
* EXIT WITH LAT IN R0,1 LONG IN R2,3 (3 REGISTERS ADDED)

MAKE_LAT_LONG:

4595 28R 14A7 C250
4596 40 14A8 C035
4597 578 14A9 1800
4598 594 14AA 6866
4599 610 14AB 6844
4600 614 14AC 8C46
4601 618 14AD AC70
4602 622 14AE AC04
4603 1068 14AF 1000
4604 1606 1480 1800
4605 1610 1481 AC30
4606 1626 1482 D520

FET 15.0
FET 3.5
ATAN 0.0
MPYD 6.6
MPYD 4.4
ADDD 4.6
CLAD 7.0
CLAD 0.4
SQRT 0.0
ATAN 0.0
CLAD 3.0
B8K 2

V1,V2,V3
V2,V3
LONGITUDE
"LAT = ARCTAN R1 / (R3**2
" + R2**2)**.5
COS LAT SQUARED
"LONG = ARCTAN R3 / R2

LATITUDE

```

DP075100
#075110
#075120
#075130
#075140
#075150
#075160
#075170
C1075180
DP075190
#1075200
DP075210
DP075220
075230
#1075240
#075250
DP075260
DP075270
DP075280
DP075290
DP075300
DP075310
DP075320
DP075330
DP075340
#1075350
DP075360
DP075370
DP075380
DP075390
#075400
DP075410
DP075420
DP075430
#075440
DP075450
DP075460
DP075470
DP075480
C1075490
DP075500
#075510
#075520

```

MAKE RANGE AND BEARING

* THIS ROUTINE WILL COMPUTE THE RANGE AND BEARING BETWEEN 2 POINTS AND
 * CONVERT THE BEARING FOR DISPLAY. THE ARGUMENTS CONSIST OF POINTERS
 * TO THE SELECTED DESTINATIONS (13 INDICATES THAT THE CRAFT IS TO BE
 * USED AS THE START POINT).

* MAKE_RANGE_AND_BEARING:

4607	4607	1483	9F22	IX2,2	"READ END POINTER CLAM
4608	12 *	1484	F80D173E	MAKE_DESTINATION_VECTOR	"COMPUTE POSITION VECTOR TO THE
4609	42	1486	F4571F30	5,, BEARING_TEMPS	"SELECTED END POINT"
4610	44	1488	9818	1,, 11	SHIP
4611	48	1489	D017 (14C1)	"WAS THE CRAFT	
4612	10R	148A	F82A00C0	"SELECTED AS THE START POINT?"	
4613	80	148C	F0C1F57	2,, THETA_P	"SET ALPHA = - THETA P
4614	94	148E	F80C1F55	15,, RIJ_STAR+2	"READ RIJ POSITION MATRIX
4615	98	14C0	D008 (14C9)	0,, RIJ_STAR	
4616	2R	14C1	8411	\$2	"SET ALPHA = 0
4617	6	14C2	8822	1,1	"READ SELECTED START POINT
4618	20	14C3	F91C1FC4	2,2	"LATITUDE AND LONGITUDE
4619	34	14C5	F93C1FDE	X1,, DESTINATION_LONGITUDE	
4620	42 *	14C7	F80D0FA6	X3,, DESTINATION_LATITUDE	"COMPUTE POSITION MATRIX (RIJ)
4621	30R	14C9	F4571F36	PANEL_MAIN\$8	"FOR SELECTED START POINT
4622	60	14C8	F05C1F30	5,, BEARING_TEMPS+6	"COMPUTE BEARING
4623	68 *	14CD	F80D1728	"= -ARCTAN (-R2.D/R3.D) + ALPHA	
4624	72	14CF	A880	5,, BEARING_TEMPS	
4625	82	14D0	D710	REGISTER_DOT	
4626	112	14D1	F05C1F30	8,0	
4627	120 *	14D3	F80D1728	1	
4628	658	14D5	1800	5,, BEARING_TEMPS	
4629	666	14D6	C013	REGISTER_DOT	
4630	670	14D7	8802	0	
4631	1246	14D8	0C00	1,3	
4632	1284	14D9	F07C1F2E	0,2	
4633	1314	14D8	F05C1F36	BEARING_DISPLAY	"CONVERT BEARING FOR DISPLAY
4634	1322 *	14D8	F05C1F36	7,, BEARING_TEMPS-2	
4635	1338	14DD	F80D1714	5,, BEARING_TEMPS+6	
		14DF	6800	REGISTER_CROSS	"COMPUTE CENTRAL ANGLE FOR RANGE
				0,0	
				MPYD	

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4636	1354	14E0 6822	MPYD 2,2	"= ARCTAN (MAG(D X RI)/D.RI)	DP075530
4637	1370	14E1 6844	MPYD 4,4		CI075540
4638	1374	14E2 8C02	ADD 0,2		CI075550
4639	1378	14E3 8C04	ADD 0,4		CI075560
4640	1824	14E4 1000	SQRT 0		CI075570
4641	1854	14E5 FC5C1F30	5,, BEARING_TEMPS		CI075580
4642	1884	14E7 FC5C1F36	5,, BEARING_TEMPS+6		DP075590
4643	1892	14E9 F80D1728	REGISTER_DOT		8 075600
4644	2430	14E8 1800	0		CI075610
4645	2434	14EC AC60	ATAN		CI075620
4646	2456	14ED D550	CLAD		CI075630
			8BK		#075640
			5	VARSAVE	#075650
					#075660
				* THIS ROUTINE TRANSFERS THE CRAFT RELATED DATA USED BY THE VARIOUS	#075670
				* DISPLAY PROGRAMS INTO A SPECIAL STORAGE AREA. THIS TRANSFER DOES NOT	#075680
				* OCCUR DURING THE HOLD MODE	
4647	12R	14EE F4280013	VARSAVE	2,, PANEL_BOUND-PANEL_DATA-1	#075690
			FETM	"TRANSFER PARAMETERS THAT RESIDE	CI075700
				"IN THE UPPER END OF MEMORY INTO	DP075710
				"THE HOLD AREA. (RIJ AND V SEA)	DP075720
4648	8R	14F0 F51A1F67	CLA		DP075730
4649	18	14F2 F1171F53	STA	X1,, PANEL_DATA	8 075740
4650	26	14F4 C415 (14F0)	8XU	X1,, PANEL_BUFFER	CI075750
4651	38R	14F5 FC7C0088	FET	1,, \$1	8 075760
4652	76	14F7 F4771F48	PTR	7,, V_TAS	8 075770
				"TRANSFER PARAMETERS THAT RESIDE	DP075780
				"IN THE LOWER END OF MEMORY INTO	DP075790
				"THE HOLD AREA. (V LOG, TIME,	
4653	92	14F9 D520	8BK	"VC2, VC3, THETA P, PSI A)	DP075800

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DP075810
DP075820
DP075830
DP075840
DP075850
DP075860
DP075870
DP075880
DP075890
DP075900
DP075910
DP075920
DP075930
DP075940
DP075950
DP075960
DP075970
DP075980
DP075990
DP076000
DP076010
DP076020
DP076030
DP076040
DP076050
DP076060
DP076070
DP076080
DP076090
DP076100
DP076110
DP076120
DP076130
DP076140
DP076150
DP076160
DP076170
DP076180
DP076190
DP076200
DP076210
DP076220
DP076230

DISPLAY CONVERSION ROUTINE

* THIS PIN ROUTINE WILL CONVERT DATA TO BCD FOR DISPLAY AND SET UP THE
* LEGEND. THE INPUT CONSISTS OF A 32 BIT WORD TO BE DISPLAYED AND A
* POINTER TO A CONVERSION TABLE. EACH ENTRY IN THE TABLE CONTAINS A 32
* BIT SCALE FACTOR AND A 16 BIT CONTROL WORD. EACH INPUT WORD WILL BE
* MULTIPLIED BY THE SCALE FACTOR BEFORE CONVERSION TO BCD. THE SCALE
* FACTOR SHOULD PUT THE INPUT WORD INTO THE UNITS OF THE LOWEST DIGIT OF
* THE DISPLAY (VELOCITY WOULD BE IN UNITS OF KNOTS) SCALED $D+5 B+3$.
* THIS ROUTINE WILL THEN CONVERT THE NUMBER TO 6 BCD DIGITS WITH THE
* LAST DIGIT APPEARING IN THE LOWEST DIGIT OF THE DISPLAY.

* THE 8 MSB'S OF THE CONTROL WORD ARE TRANSFERRED DIRECTLY TO THE UPPER 8
* BITS OF THE LEGEND TO TURN ON THE PUNCTUATION AND/OR L, R, M, E FOR
* THE RIGHT DISPLAY AND KTS, NMI, S, N FOR THE LEFT DISPLAY. IF THE
* SCALED INPUT WORD IS NEGATIVE BITS 9 TO 12 ARE ADDED TO THE LEGEND.
* THIS HAS THE EFFECT OF CHANGING N TO S, E TO W OR R TO L. THE FOUR
* LSB'S OF THE CONTROL WORD DEFINE THE NUMBER OF LEADING BLANKS FOR A
* DISPLAY. ALL ZERO'S IN THE FIRST N CHARACTERS ARE CHANGED TO BLANKS

* WHENEVER THE POINTER POINTS TO THE FIRST ENTRY IN THE CONVERSION TABLE
* (0) THE INPUT IS SHIFTED RIGHT ONE BIT WITHOUT SIGN SPREAD. THIS IS
* USED FOR THE CONVERSION OF ANGLES WITH A RANGE OF +180 TO -180 TO
* ANGLES BETWEEN 0 AND 360.

* SPECIAL HANDLING OF LATITUDE AND LONGITUDE HAS BEEN PROVIDED BECAUSE
* THEY ARE DISPLAYED IN UNITS OF DEGREES AND MINUTES. THE PUNCTUATION
* BIT IN THE CONTROL WORD THAT TURNS ON THE HIGH ORDER DEGREE LAMP IS
* USED AS A MARKER SIGNIFYING LAT OR LONG. THE SCALE FACTOR MUST CON-
* VERT THEM TO DEGRESS SCALED D283.

* THE OUTPUT IS ALL SET UP FOR THE MAIN DISPLAY ROUTINE TO OUTPUT TO THE
* C/I PANEL. EACH ENTRY SETS UP THE DISPLAY FOR EITHER THE LEFT OR THE
* RIGHT SIDE OF THE PANEL. THE FIRST ENTRY IS THE RIGHT SIDE AND THE
* SECOND ENTRY SETS UP THE LEFT SIDE UNLESS THE CALLING PROGRAM SETS UP
* ONE OF THE DISPLAYS SEPARATELY

* NUMBER IN R1,2
* POINTER TO TABLE IN R0
* GEN_PIN MPIM FLG
* 0,3
* BT+EQR+8
* WFIX POINTER FOR 3 WORDS
* WPER ENTRY
* WIS IT POINTING

4654 4R 14FA 4403
4655 6 14FB DEAD

4656	10	14FC	D013	(1500)	MOD 36	05/18/76	AN/BRN-7		PAGE 211
4657	10R	14FD	F8154000		*		BNE RSLD	\$10 1,,1	"TO THE FIRST TABLE ENTRY? "RESCALE ANGLE TO 2PI OR 360 DEG "AND MAKE IT POSITIVE "FLAG HEADING TO FORCE BLANKS "IN LAST THREE DIGITS
4658	12	14FF	DE01		*		FLG	8	076270 076280
4659	4R	1500	F4091541		\$10		ADD FET	0,, 12,0	CI076290 DP076300
4660	20	1502	C220				FETM	4,,0	DP076310
4661	34	1503	8440		*				CI076320
4662	50	1504	6895		*				CI076330
4663	54	1505	D026	(150C)	*				DP076340
4664	2R	1506	9475				BGE	\$2	DP076350
4665	6	1507	F879A133				ADD CCMM	7,,5 7,,X(A133)	\$R076360 076370
4666	10	1509	D061	(150B)			BRE	\$1	076380
4667	2R	150A	9470		*		ADD	7,,13	076390
4668	4R	150B	A899		\$1		CLS0	9,9	076400
4669	8R	150C	E487173D		\$2		EXT	8,7,HX0F00	076410
4670	14	150E	FC850080				RSL	8,,8	076420
4671	18	1510	FC39053E		*				076430
4672	22	1512	D0B3	(1516)	*				076440
4673	10R	1513	FC981562				ADD		076450
4674	14	1515	D006	(151C)			BUC	\$86	DP076460
4675	2R	1516	9870		\$85		CCMM	7,,0	DP076470
4676	6	1517	D023	(1518)	*				CI076480
4677	4R	1518	D0A2	(1519)			BGE	\$9	CI076490
4678	4R	1519	F439037F				BRT	\$9	076500
4679	4R	151B	BC92		*		ADD	9,2	076510
					*				076520
					*				076530
					*				\$1076540
					*				"LATITUDE OR LONGITUDE DISPLAY?
					*				"BYPASS IF HEADING
					*		ADD	3,,F((11)/305B-13)	076560
					*				DP076570
					*				"NUMBER BECAUSE LAT AND LONG WILL
					*				DP076580
					*				"BE CONVERTED TO MINUTES LATER
					\$9				DP076590
					*				DP076600
					*				"ROUND INPUT"
					*				DP076610
					*				"CLEAR DOUBLE REGISTER FOR
					*				DP076620
					*				"THE BCD CHARACTERS
					*				DP076630
					*				"SET UP 2 AND 3 COUNTS TO CONVERT
					*				DP076640
					*				"THE SIX DIGITS. THE TWO COUNT-
					*				DP076650
					*				DP076660

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"ERS ARE USED BECAUSE LAT AND
"LONG ARE CONVERTED IN 2 GROUPS
"OF 3 DIGITS

DP076670
DP076680
DP076690
DP076700

COUNT OF 3
COUNT OF 2

CI076710
CI076720
CI076730
*H076740
*H076750
CI076760
DP076770
*H076780
*H076790
076800
CI076810
DP076820
DP076830
CI076840
DP076850
DP076860
DP076870
DP076880
DP076890
DP076900
*H076910
*H076920
*H076930
*H076940
DP076950
DP076960
DP076970
DP076980
DP076990
DP077000
DP077010
DP077020
DP077030
DP077040
*H077050
*H077060
*H077070
*H077080
*H077090

* THE ENTRY TO THE CONVERSION

* LOOP IS AT \$6

* REGISTERS: 0,1,0,2,0F00/0800, DIGIT WORDS,, LEGEND, BLANKS, NUMBER,,

* COMM 7,,0

* BGE \$4

* BGT \$30

* MPIDM 9,,6

* BUC \$5

* MPIDM 9,,10

* LSAD 5,,4

* EXT 0,,9,MXF000

* BNE \$7

* BCD WORD IS INITIALLY ALL ZERO'S

* COMM 8,,0

* BLE \$8

* ADDM 6,,X(0F00)

* BUC \$8

* SUB 9,,0

* CLSM 8,,1

* MPLM 10,,MX0800

* ADD 6,,0

* SUBM 8,,1

* BXU 2,,\$4

* BXU 1,,\$3

* CLA 10,,7

4680 4R 151C 8E55
4681 6 151D 9C32
4682 8 151E 9C11
4683 12 151F 0008 (1528)

4684 2R 1520 9870
4685 6 1521 0023 (1525)
4686 4R 1522 01A7 (153A)
4687 6R 1523 4C56

4688 10 1524 00Q1 (1526)
4689 6R 1525 4C9A
4690 6R 1526 FC540010

4691 8R 1528 E409178B
4692 12 152A 0015 (1530)
4693 2R 152B 9880

4694 6 152C 0047 (1534)
4695 4R 152D F4690F00
4696 8 152F 0004 (1534)
4697 2R 1530 8090
4698 4 1531 8C81
4699 12 1532 5260 (00E0)
4700 14 1533 8460

4701 2R 1534 9081
4702 10 1535 C521 (1525)
4703 8R 1536 C517 (1520)
4704 2R 1537 A4A7

4705	6	1538	AC85	MOD 35	05/18/76	AM/BRN-7	8,5	"REPOSITION RESULTS FOR DISPLAY DP077100	PAGE 220
4706	32	1539	D570				7	CI077110	
4707	6R	153A	FC541000	\$30			5,12	"SHIFT TO DEGREES POSITION	077120
4708	8	153C	8C61				6,1	"FORCE BLANKS IN LAST	077130
4709	16	153D	E4351128				5,5,HXFFFO	"3 DIGITS IF	077140
4710	18	153F	945F				5,15	"HEADING"	077150
4711	22	1540	D80A (1537)				\$29		077160

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4712	1541	3999999A	CONVERSION_DATA;	CND	F(360/10283)	DP077170
4713	1543	8024	CND	CND	X(8024)	DP077180
4714	0000		BEARING_DISPLAY;	CON		DP077190
4715	0715		BEARING_DISPLAY;	CON		DP077200
4716	1544	1CCCCCDD	BEARING_DISPLAY;	CON		DP077210
4717	1546	A12E	BEARING_DISPLAY;	CON		DP077220
4718	0001		BEARING_DISPLAY;	CON		DP077230
4719	1547	1CCCCCDD	BEARING_DISPLAY;	CON		DP077240
4720	1549	A025	BEARING_DISPLAY;	CON		DP077250
4721	0002		BEARING_DISPLAY;	CON		DP077260
4722	154A	20C498A6	BEARING_DISPLAY;	CON		DP077270
4723	154C	4300	BEARING_DISPLAY;	CON		DP077280
4724	0003		BEARING_DISPLAY;	CON		DP077290
4725	154D	114F849C	BEARING_DISPLAY;	CON		DP077300
4726	154F	242D	BEARING_DISPLAY;	CON		DP077310
4727	0004		BEARING_DISPLAY;	CON		DP077320
4728	1550	03E23001	BEARING_DISPLAY;	CON		DP077330
4729	1552	2328	BEARING_DISPLAY;	CON		DP077340
4730	0005		BEARING_DISPLAY;	CON		DP077350
4731	1553	0199999A	BEARING_DISPLAY;	CON		DP077360
4732	1555	2428	BEARING_DISPLAY;	CON		DP077370
4733	0006		BEARING_DISPLAY;	CON		DP077380
4734	1556	003E6264	BEARING_DISPLAY;	CON		DP077390
4735	1558	242D	BEARING_DISPLAY;	CON		DP077400
4736	0007		BEARING_DISPLAY;	CON		DP077410
4737	1559	0199999A	BEARING_DISPLAY;	CON		DP077420
4738	1558	0000	BEARING_DISPLAY;	CON		DP077430

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4739	BASE_DISPLAY;			DP077600
4739	0008	EQ	CD11/3-CDD	DP077610
4740	155C Q051F000	CND	X(0051F000)	077620
4741	155E 22E	CND	X(22E)	077630
4742	0009	EQ	CD12/3-CDD	077640
4743	155F C00FA000	CND	F(18-210+3)	077650
4744	1561 21E	CND	X(21E)	077660
4745	000A	EQ	CD13/3-CDD	077670
4746	1562 C0147AE1	CND	F((11)/20283)	077680

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CI 077690

BCD TO BINARY

```
* THIS ROUTINE WILL CONVERT THE 6 CHARACTER DISPLAY IMAGE TO BINARY
* WITH THE LSB OF THE BINARY WORD EQUAL TO 1 COUNT IN THE LSD OF THE
* DISPLAY. THE BIT IN THE LEGEND THAT TURNS ON THE HIGH ORDER DEGREE
* LAMP ON THE DISPLAY IS USED AS A MARKER TO SIGNIFY A LATITUDE OR LONG-
* TITUDE CONVERSION.
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20R	1564	8472	BCD TOR IN	FETM	7, 2	"SET UP A 3 COUNT AND 2 COUNT TO	DP077780
22	1565	9C51		CLAM	5, 1	"CONTROL THE 6 DIGIT CONVERSION	DP077790
26	1566	0007	(156E)	BUC	\$3	AND 5 WORKING REGS	C1077800
8R	1567	F41A0007	\$1	CLA	1, C, I, LEFT_DISPLAY_LEGEND_AND_PUNCTUATION	"EXAMINE THE HIGH DEGREE BIT	DP077810
			*			"IS THIS A	DP077820
			*			"BYPASS IF HEADING	*1077830
12	1569	4414		LSA	1, 2		077840
16	156A	0022	(156D)	BGE	\$2	"MULTIPLY BY 6 TO CONVERT	077850
6R	156B	4C26		MPIDM	2, 6	"DEGREES TO 10'S OF MINUTES	DP077860
10	156C	0001	(156E)	BUC	\$3	"MULTIPLY CONVERTED DATA BY 10	DP077870
6R	156D	4C2A	\$2	MPIDM	2, 10	"BEFORE ADDING IN THE NEXT DIGIT	DP077880
			*			"SHIFT BCD CHARACTERS END AROUND	DP077900
8R	156E	FC850010	\$3	LSUED	8, 4	"LEFT TO GET NEXT MOST SIGNIFI-	DP077910
16	1570	E419177D	*	EXT	1, 9, HX000F	"CANT DIGIT IN THE LOW BITS AND	DP077920
			*			"EXTRACT THE NEW DIGIT	DP077930
18	1572	9819		COMM	1, X(9)	"	*2077940
22	1573	0031	(1575)	BRG	\$5	"IS THIS DIGIT GREATER THAN 9?	DP077950
			*			"(BLANK IS 15)	DP077960
4R	1574	8C20	\$4	ADDD	2, 0	"ADD NEW DIGIT TO BINARY	DP077970
			*			"ACCUMULATION	DP077980
			*			"HAS THE SET OF 3	*1077990
8R	1575	C469	(156D)	BXU	6, \$2	"DIGITS BEEN CONVERTED YET?	3R078000
			*			"HAVE THE 2 SETS	*1078010
9R	1576	C550	(1567)	BXU	5, \$1	"OF 3 DIGITS BEEN CONVERTED YET?	3R078020
4R	1577	AC82		CLAD	8, 2	"REPOSITION RESULTS"	DP078030
30	1578	D570		BBK	7		C1078040

MOD 36 05/18/76 AN/BRN-7

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**
* RZ POSITION UPDATE
*
* THIS ROUTINE IS A SLOW NON OMEGA TASK
* (ONCE PER SEC) THAT UPDATES THE MOVING
* DESTINATION POSITION
RZ_UPDATE FETM 3,0 "COMPUTE AND SAVE RZ RATE IN
          CLA 2,1 RZ_VEL "RADIANS/SEC AT 3-14
          CLAD 0,1 RZ_POS "
          MPYD 0,0 82
          MPYD 0,1 =DF((-3.36D-5)*20.926428D6)/1824)
          ADD 0,1 =DF((20.926428D6)/1826)
          DIVD 2,0 "RZ RATE = RZ VEL/EARTH RADIUS
          STAD 2,1 RZ_RATE "WHERE ER = RHO(1 - K*RZ1**2)
          RSAD 2,1 13 SCALE RAD/SEC 8-1
          FET 5,1 RZ_POS
          FET 7,1 RZ_BETA
          BSV REGISTER_CROSS "COMPUTE RZ C = BETA X RZ POS
          FET 5,5 REPEAT
          PTR 5,1 RZ_C "SAVE RZ C AT 82
          MPYD 0,10 "UPDATE RZ POS"
          MPYD 2,10 "NEW RZ POS = OLD RZ POS +
          MPYD 4,10 (RZ RATE)*(RZ C)
          FET 5,1 RZ_POS NEW RZ
          ADD 0,6
          ADD 2,8
          ADD 4,10
          PTR 5,1 RZ_POS
          BSK 13
          1579 8430
          157A F42A1FD8
          157C FCOA1FB8
          157E 6800
          157F F8061AD4
          1581 FC061AD6
          1583 DC20
          1584 F8271FF2
          1586 4824
          1587 F05C1F88
          1589 F07C1F8E
          158B F80D1714
          158D C055
          158E F4571F82
          1590 680A
          1591 682A
          1592 684A
          1593 F05C1F88
          1595 8C06
          1596 8C28
          1597 8C4A
          1598 F4571F88
          159A D5DQ
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MOD	36	05/18/76	AN BRN-7	PAGE 225
*	*		RZ TIME UPDATE	DP078340
*	*			*H078350
*	*			*H078360
*	*			*H078370
*	*			*H078380
*	*			*H078390
*	*			*H078400
*	*			*H078410
*	*			*H078420
*	*			DP078430
	30R	1598	F05C1F69	"READ VECTORS R1 AND RZ C TO
4788				"FORM SIN OF ANGLE BETWEEN CRAFT
4788				"AND MOVING DESTINATION
4789	60	1590	F05C1F82	"THE SIN WILL BE PLUS IF THE
				"DEST IS MOVING TOWARDS THE CRAFT
				"OTHERWISE IT WILL BE MINUS
				"CL1 = SIN(GAMMA) = R1 * RZ C
				" CL1 B2 SCALED B2
4790	68 *	159F	F80D1728	"READ VECTOR'S R1 AND RZ POS TO
4791	72	15A1	8C00	"FORM COS OF ANGLE BETWEEN CRAFT
4792	102	15A2	F05C1F69	"AND MOVING DESTINATION
4793	132	15A4	F05C1F88	"BL1 = COS(GAMMA) = R1 * RZ POS
				" REPEAT CL1, BL1 SCALED B2
4794	140 *	15A6	F80D1728	"COMPUTE (BL1**2 + CL1**2)**.5
4795	152	15A8	CQ33	" FOR F(T) COMPUTATION
4796	168	15A9	6800	(CL1**2 + BL1**2)**.5 B2
4797	184	15AA	6822	"COMPUTE GAMMA = ATAN (CL1/BL1)
4798	188	15AB	8C20	" FT/SEC B12 FOR F(T) COMPUTATION
4799	198	15AC	D710	"COMPUTE CRAFT GROUND SPEED (GS)
4800	644	15AD	1001	"CRAFT RATE = GS/EARTH RADIUS
4801	656	15AE	CQ35	"WHERE ER = RHO(1 - K*R11**2)
4802	1194	15AF	1800	0,,=DF((-3.36D-5)*20.926428D6)/1B24)
4803	1206	15B0	868E (O0BE)	0,,=DF((20.926428D6)/1B26)
4804	1214 *	15B1	F80D1751	A/C RATE RAD/SEC B-14
4805	1228	15B3	F80C1F69	0,, RZ_RATE
4806	1244	15B5	6800	0,,=DF(((5)*3600)/3.1415925814) *SET FIRST GUES
4807	1264	15B6	F8061AD4	"T(0) = 5 HOURS
4808	1274	15B8	FC0B1AD6	DP078710
4809	1400	15BA	DC20	DP078720
4810	1410	15BB	FC0A1FE2	DP078730
4811	1424	15BD	F80C1AD8	DP078740
4812	1432	15BF	8410	DP078750
				DP078760

PAGE 226

4813	1434	1500 9880	MOD 36	05/18/76	AN/BRN-7	COMM	8,0	ALPHA	DP078770
4814	1438	1501 0058 (15CA)	*			BRL	\$10	"IS THE DEST "MOVING AWAY FROM THE CRAFT? "(GAMMA MINUS)	DP078780
4815	4R	1502 AC08				CLAD	0,8		DP078790
4816	8	1503 8804				CCMD	0,4		DP078800
4817	12	1504 0025 (15CA)				BGE	\$10		DP078810
4818	126R	1505 DC04	*			DIVD	0,4	CHECK FOR OVERFLOW "COMPUTE TIME FOR DEST TO ARRIVE "AT CRAFT IF IT WAS HEADING AT "THE CRAFTS CURRENT POSITION "IS THE TIME TO "ARRIVE MORE THEN T(0)? (5 HR) "SET T(0) = TIME TO ARRIVE	DP078820
4819	130	1506 8802				CCMD	0,2		DP078830
4820	134	1507 0022 (15CA)	*			BGE	\$10		DP078840
4821	2R	1508 DE00				FLG	A		DP078850
4822	6	1509 AC20						"SET PROGRAM FLAG A TRUE FOR "LATER FIXUP OF DELTA T IF THIS "NEW T(0) IS TOO LARGE	DP078860
4823	10R	150A FCOA1ADA							DP078870
4824	14	150C B802	\$10			SUBD		"THIS PATH IS NECESSARY TO INSURE "THAT THE INTERCEPT POINT WILL "OCCUR BETWEEN THE DEST AND THE "CRAFT AND NOT AFTER THE DEST "HAS PASSED THE CRAFT "SET DELTA T = 10 HOUR - T(0)	DP078880
							2,0		DP078890
							0,2		DP078900
									DP078910
									DP078920
									DP078930
									DP078940
									DP078950
									DP078960
									DP078970
									DP078980
									DP078990
									DP079000
									DP079010
									DP079020
									DP079030
									DP079040
									DP079050
									DP079060
									DP079070
									DP079080
									DP079090
									DP079100
4825	10R	150D F8044000	\$1			RSAD	0,1	"REDUCE DELTA T BY HALF FOR USE "AT THE END OF THIS ITERATION "COMPUTE F(T)"	DP079110
4826	18	150F CQ15				FET	1,5		DP079120
4827	34	1500 6804				MPYD	0,4		DP079130
4828	38	1501 B80A				SUBD	0,10	"= ((BL1**2 + CL1**2)**.5)*	DP079140
4829	46	1502 F80D1655				BSV	COS		DP079150
4830	62	1504 680C				MPYD	0,12	" COS((RZ RATE)*T(0) - GAMMA)	DP079160
4831	68	1505 4C04				LSAD	0,2	" - COS((CRAFT RATE)*T(0))	DP079170
4832	76	1506 CQ19				FET	1,9	A/C RATE	DP079180
4833	92	1507 6806				MPYD	0,6	T	DP079190

4834	100 *	1508	F80D1655	MOD 36	05/18/76	AN/BRN-7	8SV	COS	PAGE 227
4835	104	150A	B820	*			SUBD	2,0	\$ 079200
4836	108	150B	D056 (15E2)	*			BRL	\$ 2	DP079210
4837	4R	150C	D093 (15E0)				BAF	\$11	*2079220
4838	4R	150D	AC46				CLAD	4,6	DP079230
4839	14	150E	F8444000				RSAD	4,1	DP079240
4840	4R	15E0	B864	\$11			SUBD	6,4	*R079250
4841	8	15E1	D001 (15E3)				BUC	\$ 3	DP079260
4842	4R	15E2	8C64	\$2			ADDD	6,4	DP079270
4843	2R	15E3	DE8C	\$3			FLG	AT+ROR+A	DP079280
4844	16	15E4	D730				PRN	3	DP079290
4845	26	15E5	F8081ADC	*			CMDD	0,,=DF((11)/3.14159265814) 1 SEC	DP079300
4846	30	15E7	D938 (15CD)	*			BRG	\$1	DP079310
4847	12R	15E8	F8271FD8	*			STAD	2,,RZ_TIME	DP079320
4848	28	15EA	6842	*			MPYD	4,2	DP079330
4849	38	15EB	7A4F				STAD	14,15	*2079340
4850	72	15EC	D7D0				PRN	13	DP079350
4851	506	15ED	1400				SINCOS	0	DP079360
4852	526	15EE	8474				FETM	7,,4	DP079370
4853	528	15EF	90F6				SUBM	15,,6	DP079380
4854	10R	15F0	FD6A1FB2	\$20			CLAD	X6,,RZ_C	DP079390
4855	14	15F2	AC20				CLAD	2,0	DP079400
4856	30	15F3	4856				MPYD	2,10	DP079410
4857	36	15F4	4C22				LSAD	2,,1	DP079420
4858	46	15F5	FD6A1FB8				CLAD	X6,,RZ_POS	DP079430
4859	62	15F7	6808				MPYD	0,8	DP079440
4860	66	15F8	BCC2				ADDD	0,2	DP079450
4861	72	15F9	4C02				LSAD	0,,1	DP079460
4862	82	15FA	7B6F				STAD	1X6,15	DP079470
4863	90	15FB	CC6C (15F0)	*			BXUD	6,,120	DP079480
4864	2K	15FC	A40F	*			CLA	0,15	*2079490
4865	10 *	15FD	F80D14A7	*			BSV	MAKE_LAT_LONG	DP079500
4866	22	15FF	F8071FF6				STAD	0,,INTERCEPT_LAT	DP079510
4867	34	1601	F8271FDC				STAD	2,,INTERCEPT_LONG	DP079520

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DP079630
DP079640

EVEN UP F
"DESTINATIONS

MOD 36 05/18/76 AM/BRN-7 2 13.6
PRN
58K

1603 D720
1604 D506

46
84

4868
4869

MOD 36 05/18/76 AN/BRN-7

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P8079650

BEARING SUBROUTINE

P8079660

P8079670

P8079680

P8079690

*H079700

*H079710

*H079720

*H079730

*H079740

*H079750

*H079760

P8079770

P8079780

P8079790

* 079800

P8079810

P8079820

P8079830

P8079840

* 079860

P8079870

P8079880

P8079890

P8079900

P8079910

**
*
*
* ENTER WITH ADDRESS OF R2 IN R0 AND ADDRESS OF D IN R1. THE ROUTINE
* WILL COMPUTE - ARCTAN (-D.R3, D.R2) AND LEAVE IT IN R0, R1
*
*
*
* THIS ROUTINE WILL COMPUTE THE ANGLE BETWEEN THE R3 AXIS AND A VECTOR
* IN THE PLANE OF R2, R3 POINTING AT A FIXED POSITION. THE ARGUMENTS
* CONSIST OF A POINTER TO THE R2 VECTOR OF THE RIJ MATRIX AND A POINTER
* TO A VECTOR THAT DEFINES THE FIXED POSITION.
*
*
*

4870	8R	1605	8506	FETM	X0.6	ADDRESS OF R3
4871	28	1606	8474	FETM	7.4	"COMPUTE BEARING
4872	3R	1607	AF68	CLAD	IX6.8	"
4873	26	1608	686A	MPYD	IX6.10	D.R3
4874	30	1609	8C20	ADD	2.0	" - ARCTAN - (D . R2) / (D . R3)
4875	38	160A	AF69	CLAD	IX6.9	"
4876	56	160B	686A	MPYD	IX6.10	D.R2
4877	60	160C	8C40	ADD	4.0	"
4878	68	160D	CC67	BXUD	6.11	"
4879	10R	160E	DT10	PRN	1	SCALED PI
4880	14	160F	A822	CLSD	2.2	-D.R3
4881	552	1610	1800	ATAN	0.0	"
4882	556	1611	A850	CLSD	5.0	- ANGLE
4883	576	1612	D540	8BK	4	"

(1607)

MOD 36 05/18/76 AN/BRN-7

**

* CORRECT TIME ENTRY TO CLOSEST SYNC TIME MOD 10 SECONDS
CALC_TIME_CORRECTION:

4884	30R	1613	F05C00C6	5, GMT	GMT PLUS 4 REGISTERS	079920
4885	38	1615	92BC (008C)	0, TIME		079930
4886	46	1616	968B (008B)	0, START_SYNC_TIME RO IS GMT SINCE SYNC		079940
4887	56	1617	FC081785	0, LEAP_SECOND		079950
4888	60	1619	AC40	4, 0	SAVE GMT SYNC SYNC	1079990
4889	70	161A	FC2A1ADE	2, =DF((.005)/10)		080000
4890	86	161C	6802	0, 2	RESCALE TO 10 SECONDS AT B31	3080010
4891	212	161D	DC02	0, 2	IN ORDER TO ROUND	4080020
4892	216	161E	B804	0, 4	CORR TO GMT	5080030
4893	220	161F	AC40	4, 0		6080040
4894	228	1620	96C6 (00C6)	0, GMT		7080050
4895	238	1621	7846 (00C6)	0, GMT		8080060
4896	258	1622	F84600E7	4, =DF(((50-3831)/24)/(3600)/(1811))		9080070
4897	268	1624	FC4800C4	4, DAY_SINCE_JANL_1972		10080080
4898	280	1626	F84700C4	4, DAY_SINCE_JANL_1972		11080090
4899	302	1628	0550	5		12080100

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SQUARE ROOT

* THIS ROUTINE WILL TAKE THE SQUARE ROOT OF THE ARGUMENT. A NEGATIVE
* ARGUMENT WILL RESULT IN AN ANSWER THAT IS THE INITIAL ARGUMENT NORMA-
* LIZED. A ZERO ARGUMENT WILL GIVE A ZERO RESULT.

* INCLUDE TABLE OF ASCENDING POWERS OF TWO LABELED POWERS_OF_TWO
* DOUBLE PRECISION SQUARE ROOT
* ARGUMENT IN RO,1. RESULT IN RO,1.

* TIME IN MICROSECONDS:

296 + 4N IF N IS ODD (1 THROUGH 31)
318 + 4N IF N IS EVEN (2 THROUGH 30)
54 IF N IS 32 (ARGUMENT ZERO)

* WHERE N IS THE NUMBER OF LEADING ZEROS IN THE ARGUMENT

0, 31

SQUARE_ROOT CLAM

1629 FC09001F

4R

4900

1628 DD10

136

4901

162C C023

146

4902

162D D14E (164C)

150

4903

162E FC04E506

6R

4904

1630 F40971F2

10

4905

1632 6004

16

4906

1633 F4092823

20

4907

1635 A424

22

4908

1636 8020

24

4909

1637 D042 (163A)

28

4910

1638 F4090015

4R

4911

163A D420

32R

4912

163B B402

34

4913

163C 5263 (00E3)

42

4914

163D DC40

168

4915

163E 8C04

172

4916

163F 5A63 (00E3)

184

4917

1640 F4358000

190

4918

1642 DC54 (1647)

194

4919

1643 F8061640

20R

4920

1645 F4398000

24

4921

1647 F4398005

4R

4922

1649 A633

10

4923

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1629 FC09001F

4R

4900

1628 DD10

136

4901

162C C023

146

4902

162D D14E (164C)

150

4903

162E FC04E506

6R

4904

1630 F40971F2

10

4905

1632 6004

16

4906

1633 F4092823

20

4907

1635 A424

22

4908

1636 8020

24

4909

1637 D042 (163A)

28

4910

1638 F4090015

4R

4911

163A D420

32R

4912

163B B402

34

4913

163C 5263 (00E3)

42

4914

163D DC40

168

4915

163E 8C04

172

4916

163F 5A63 (00E3)

184

4917

1640 F4358000

190

4918

1642 DC54 (1647)

194

4919

1643 F8061640

20R

4920

1645 F4398000

24

4921

1647 F4398005

4R

4922

1649 A633

10

4923

SQUARE ROOT

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* DOUBLE PRECISION SQUARE ROOT
* ARGUMENT IN RO,1. RESULT IN RO,1.

* TIME IN MICROSECONDS:

296 + 4N IF N IS ODD (1 THROUGH 31)
318 + 4N IF N IS EVEN (2 THROUGH 30)
54 IF N IS 32 (ARGUMENT ZERO)

* WHERE N IS THE NUMBER OF LEADING ZEROS IN THE ARGUMENT

0, 31

SQUARE_ROOT CLAM

1629 FC09001F

4R

4900

1628 DD10

136

4901

162C C023

146

4902

162D D14E (164C)

150

4903

162E FC04E506

6R

4904

1630 F40971F2

10

4905

1632 6004

16

4906

1633 F4092823

20

4907

1635 A424

22

4908

1636 8020

24

4909

1637 D042 (163A)

28

4910

1638 F4090015

4R

4911

163A D420

32R

4912

163B B402

34

4913

163C 5263 (00E3)

42

4914

163D DC40

168

4915

163E 8C04

172

4916

163F 5A63 (00E3)

184

4917

1640 F4358000

190

4918

1642 DC54 (1647)

194

4919

1643 F8061640

20R

4920

1645 F4398000

24

4921

1647 F4398005

4R

4922

1649 A633

10

4923

SQUARE ROOT

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* ARGUMENT IN RO,1. RESULT IN RO,1.

* TIME IN MICROSECONDS:

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318 + 4N IF N IS EVEN (2 THROUGH 30)
54 IF N IS 32 (ARGUMENT ZERO)

* WHERE N IS THE NUMBER OF LEADING ZEROS IN THE ARGUMENT

0, 31

SQUARE_ROOT CLAM

1629 FC09001F

4R

4900

1628 DD10

136

4901

162C C023

146

4902

162D D14E (164C)

150

4903

162E FC04E506

6R

4904

1630 F40971F2

10

4905

1632 6004

16

4906

1633 F4092823

20

4907

1635 A424

22

4908

1636

4924	20	164A	5930	MOD 36	05/18/76	AN/BRN-7	X3.0	"TO GET FINAL RESULT
4925	24	164B	AC40				4.0	
4926	16R	164C	D530				3	"EXIT"
4927		164D	5AE2799A				F(-.7071067812)	(SQUARE ROOT OF .5)

MPLDM	
CLAD	
BBK	\$2
COND	\$4

SINE - COSINE

```

**
*
* THIS SUBROUTINE WILL COMPUTE THE SIN AND COS OF ANY ANGLE SCALED PI
* THE OUTPUTS ARE SCALED 81. IT HAS SEPARATE ENTRIES FOR SIN OR COS
* ONLY.
*
* ENTER WITH ANGLE X SCALED PI IN R0,1
* RETURN WITH SINE IN R2,3 AND COSINE IN R0,1 (2 REGISTERS ADDED)
* MAXIMUM TIME IN MICROSECONDS:
* SIN 188, COS 192, SIN_COS 414.
SC_ENTRY PRN 0
SIN_COS FET 3,1
*
* BSV SIN
* CLAD 4,0
*
* PRN 1
* SINGLE FUNCTION ENTRIES
* FOR EITHER ENTRY, THE RESULT REPLACES X IN R0,1
* ENTER HERE FOR COS ONLY
COS ADD 0,1HX4000.
* ENTER HERE FOR SIN ONLY
SIN FETM 4,,55
CLAD 2,5
ADD 2,2
*
* BNO $1
* CLSD 2,2
*
* COMM 2,,F((+62)/109)
* BRG $2
* COMM 2,,F((-62)/109)
*
* BGE $3
* ADDM 4,,56-$5
* ADD 2,2
*
* BUC $4
* CLAD 5,2
*

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4928 8R 164F D700
 4929 12R 1650 C031
 4930 20 * 1651 F80D1656
 4931 24 1653 AC40
 4932 34 1654 D710
 4933 6R 1655 9663 (00E3)
 4934 16R 1656 F4481670
 4935 20 1658 AC25
 4936 24 1659 BC22
 4937 28 165A D071 (165C)
 4938 4R 1658 A822
 4939 4R 165C F82948CF
 4940 8 165E D033 (1662)
 4941 4R 165F F8298731
 4942 8 1661 D023 (1665)
 4943 2R 1662 944A
 4944 6 1663 BC22
 4945 10 1664 D001 (1666)
 4946 4R 1665 AC52

080580
 *080590
 *080600
 *080610
 *080620
 *080630
 *080640
 080650
 080660
 080670
 080680
 080690
 * 080700
 *080710
 080720
 080730
 080740
 080750
 080760
 080770
 *080780
 080790
 080800
 *080810
 080820
 080830
 080840
 *1080850
 *080860
 080870
 080880
 080890
 080900
 * 080910
 080920
 *1080930
 *080940
 080950
 080960
 080970
 080980
 080990
 081000

4947	16R	1666	6822	MOD 36	05/18/76	AN/BRN-7	2,2	"COMPUTE POWER SERIES"	PAGE 234
4948	20	1667	AC02	\$4		MPYD	0,2	"IN X**2 OR Z**2	081010
4949	38	1668	6940			MPYD	X4,0	"	081020
4950	46	1669	8D42			ADD	X4,2	"((S7X**2 + S5)X**2 + S3)X**2 + S1	081030
4951	62	166A	6802			MPYD	0,2	"	081040
4952	70	166B	8D44			ADD	X4,4	"((C7Z**2 + C5)Z**2 + C3)Z**2 + C1	081050
4953	86	166C	6802			MPYD	0,2	"	081060
4954	94	166D	8D46			ADD	X4,6	"	081070
4955	100	166E	0540008			BUC	X4,8	"EXIT TO S END OR C END	081080
4956		1670	FFB4FDE4	\$5		CND	F(-.002289069985) C7	"	081090
4957		1672	05155681			CND	F(+.039835751436) C5 SINE	"	081100
4958		1674	06A88C08			CND	F(-.322981354578) C3 COEFFICIENTS	"	081110
4959		1676	6487ED41			CND	F(+.785398156180) C1	"	081120
4960	16R	1678	6850			MPYD	5,0	"S END"	081130
4961	36	1679	D540			BBK	4	"SIN X = Y * (SERIES)	081140
4962		167A	FFB8F46	\$6		CND	F(-.000160303804) C6	"	081150
4963		167C	0103B73E			CND	F(+.007925896961) C4 COSINE	"	081160
4964		167E	EC42C40A			CND	F(-.154212373234) C2 COEFFICIENTS	"	081170
4965		1680	3FFFEFF5			CND	F(+.4999999995214) C0	"	081180
4966	2R	1682	9850			COMM	5,0	"C END"	081190
4967	6	1683	D022 (1686)	*		BGE	17	"ABSOLUTE SIN X = (SERIES)	081200
4968	4R	1684	A850			CLSD	5,0	"IS X POSITIVE?"	081210
4969	24	1685	D540			BBK	4	"SIN X = - (SERIES)	081220
4970	4R	1686	AC50	\$7		CLAD	5,0	"SIN X = (SERIES)	081230
4971	24	1687	D540			BBK	4	"	081240
								"	081250
								"	081260

MOD	36	05/18/76	AN/BRN-7
PAGE 233			
* * *			ARCTANGENT
* * *			
* * *			THIS ROUTINE WILL COMPUTE THE ARCTANGENT FOR A SINE COSINE PAIR.
* * *			THE SINE AND COSINE ARGUMENTS MUST HAVE THE SAME SCALE FACTOR AND THE
* * *			RESULTING ANGLE IS SCALED PI.
* * *			
* * *			R2+3 PROPORTIONAL TO SINE (NOT BOTH
* * *			RO+1 PROPORTIONAL TO COSINE TOO SMALL)
* * *			ANSWER SCALED PI IN RO+1. TWO REGISTERS PRUNED.
* * *			MAXIMUM TIME 518 MICROSECONDS.
* * *			ATAN_ENTRY PRN 0
* * *			"ENTER HERE WHEN NOT USING PIN ENTRY
* * *			ARCTAN RSAD 0,1
* * *			FLG 5,2
* * *			
* * *			"PUT THE SIGN OF THE COS AND SIN
* * *			"INTO PROGRAM FLAGS C AND D RE--
* * *			"SPECFULLY (FLAG TRUE IF MINUS)
* * *			"COMPUTE ABSOLUTE VALUE OF SIN/2
* * *			"AND COS/2
* * *			"
* * *			"READ POINTER TO COEFFICIENTS
* * *			"AND SET UP TERM COUNT
* * *			
* * *			TAKE MAGNITUDE
* * *			\$1
* * *			BGE CLSD 0,0
* * *			FETM 2, ATC
* * *			CLAM 0, ATC1-ATC
* * *			FET 1,6
* * *			RSAD 0,1
* * *			FLG 5,3
* * *			BGE \$2
* * *			CLSD 0,0
* * *			CLAO 7,0
* * *			SUBD 7,5
* * *			ADD 0,5
* * *			DIVD 7,0
* * *			CLAD 5,7
* * *			MPVD 5,5
* * *			CLAO X4, ATC2-ATC
* * *			MPVD 0,5
* * *			
* * *			"COMPUTE SERIES"
* * *			"
* * *			"= ((((((T72 + T6)Z + 15)Z + T4)Z
* * *			

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4992	24	169F	BF24		ADD	1X2,4	" + T31Z + T21Z + T11Z + T01X	081710
4993	32	16A0	CC23	(169E)	BXUD	2,3,3		081720
4994	16R	16A1	6807		MPYD	0,7	FINISH ODD SERIES IN X	081730
4995	18	16A2	DEEE		FLG	14,14	"SET FLAG C TRUE IF SIN OR COS	081740
				*			"ARE MINUS BUT NOT BOTH MINUS	081750
				*			"(FLAG C .EOR. FLAG D)	081760
				*			"IS THE PRODUCT	*1081770
4996	22	16A3	D001	(16A5)	BCF	\$4	"OF THE 'SIGN'S' NEGATIVE?	*R081780
4997	4R	16A4	A800		CLS0	0,0	"FORM - (SERIES)	081790
4998	6R	16A5	4022	\$4	ROF	2,2,2	"USE FLAGS D AND C #45 DEGREES TO	081800
4999	10	16A6	F4244000		LSA	2,14	"FIX THE QUADRANT	081810
5000	16	16A8	F5292000		ADD	X2,F(.25)	"D TRUE = 180, C TRUE = 90 DEG	081820
5001	20	16AA	AC70		CLAD	7,0	MOVE ANSWER	081830
5002	44	16AB	D560		BBN	6	PRUNE SEVEN AND RETURN	081840

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081850

081860

PP081870

PP081880

PP081890

PP081900

081910

PP081920

PP081930

PP081940

081950

CF081960

CF081970

CF081980

CF081990

082000

082010

*H082020

*H082030

*H082040

*H082050

082060

082070

082080

082090

082100

082110

082120

* 082130

* 082140

* 082150

*S082160

082170

082180

082190

082200

082210

DP082220

DP082230

DP082240

DP082250

DP082260

DP082270

5003

5003

5004

5005

5006

5007

5008

5009

5009

5010

5011

5012

5013

5014

5015

5016

5017

5018

5019

5020

5021

5022

5023

16AC 78A3

16AD 0094

16AE DEFO

16AF 7478

16B0 7852

16B1 7666

16B2 36103851

16B4 4826F9C1

16B6 3C207ACC

16B8 C011

16B9 A800

16BA 6802

16BB 9662

16BC 0021

16BD 8800

16BE 1000

16BF 04001689

16C1 0000

16C2 001F

16C3 0038

16C4 005A

NORTH_MAGNETIC_POLE_VECTORS:

CON F(-.9659)

CON F(.004529)

CON F(-.2588)

CON F(-.91)

CON F(-.94)

CON F(-.925)

CON F((1217.021)*.99748-9)

CON F(((1217.021)*.99748-9)*4)/3)

CON F(((1217.021)*.99748-9)*10)/9)

ARCSINE

* THIS ROUTINE WILL COMPUTE AN ANGLE SCALED PI FROM A SINE ARGUMENT (B1)

* REQUIRES SQUARE ROOT AND ARCTAN ROUTINES

* ENTER WITH SINE SCALED 2 IN RO,1

* RETURN WITH ANGLE SCALED PI IN RO,1

* "COMPUTE COS"

* " = (1 - SIN**2)**.5

* "SET COS = 0 IF SIN MORE THAN 1

* " GREATER THAN ONE

* " "COMPUTE ANGLE"

* " = ARCTAN SIN/COS

* " " (EXIT ASIN FROM ARCTAN)

28UC ARCTAN

* CUMULATIVE DAYS BY MONTH

DAYS_BY_MONTH:

CON 0

CON 31

CON 59

CON 90

JAN

FEB

MAR

APR

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DP082280
DP082290
DP082300
DP082310
DP082320
DP082330
DP082340
DP082350
DP082360
DP082370

MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN (NEXT YEAR)

120
151
181
212
243
273
304
334
365

* * *
CONSTANTS FOR ARCTAN

ATC
F(+.318309854667)
F(-.106099021806)
F(+.063565605401)
F(-.044625393671)
F(+.031558174030)
F(-.018935106721)
F(+.007719779427)
F(-.001493916081)

ATC1
ATC2

* SYNC_LIMIT_TABLE:

CON 0
CON 8
CON 22
CON 9
CON 46
CON 10
CON 72
CON 11
CON 100
CON 10
CON 126
CON 8
CON 148
CON 11
CON 176
CON 9

* DIURNAL_CONSTANT_TABLE:

CON F(-.271)
CON F(-.212)
CON F(-.241)
CON F(-.300)
IS=0 10.2
IS=0 13.6
IS=0 11.3
IS=1 10.2

16C5 0078
16C6 0097
16C7 0095
16C8 0004
16C9 00F3
16CA 0111
16CB 0130
16CC 014E
16CD 0160

16CE 28BE6096
16D0 F26858E6
16D2 0822EAF2
16D4 FA498711
16D6 040A1927
16D8 FD9388D0
16DA 00FCF634
16DC FFCF0C20

16DE 0000
16DF 0008
16E0 0016
16E1 0009
16E2 002E
16E3 000A
16E4 0048
16E5 0008
16E6 0064
16E7 000A
16E8 007E
16E9 0008
16EA 0094
16EB 0008
16EC 00B0
16ED 0009

16EE 2280
16EF 1823
16F0 1ED9
16F1 2666

5024
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5060

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5061      16F2 1E56      CON      F(.237)      IS=1 13.6      PP082710
5062      16F3 224E      CON      F(.268)      IS=1 11.3      PP082720
5063      16F4 2B85      CON      F(.340)      IS=2 10.2      PP082730
5064      16F5 226F      CON      F(.269)      IS=2 13.6      PP082740
5065      16F6 26E9      CON      F(.304)      IS=2 11.3      PP082750
5066      16F7 1AE1      CON      F(.210)      IS=3 10.2      PP082760
5067      16F8 148C      CON      F(.162)      IS=3 13.6      PP082770
5068      16F9 17CF      CON      F(.186)      IS=3 11.3      PP082780
5069      16FA 1E88      CON      F(.240)      IS=4 10.2      PP082790
5070      16FB 17F0      CON      F(.187)      IS=4 13.6      PP082800
5071      16FC 1B64      CON      F(.214)      IS=4 11.3      PP082810
                                     PP082820
                                     TF082830
5072      16FD 10D3      CON      SIGMA_SQ_PHL_DOT_PHL_DOT      TF082840
5073      16FE 1E03      CON      SIGMA_SQ_PHL_DOT_PHL_DOT      TF082850
5074      16FF 1E33      CON      SIGMA_SQ_PHL_PHL      TF082860
5075      1700 1D88      CON      SIGMA_SQ_N_COUNTER      TF082870
                                     082880
5076      1701 0085      CON      TF_TEMP      TF082890
5077      1702 1798      CON      STATION_VECTOR_TABLE      TF082900
5078      1703 1F69      CON      RIJ      TF082910
5079      1704 1E43      CON      PHL_DOT_DR      TF082920
5080      1705 1E73      CON      PHL_DOT_ESTIMATE      TF082930
5081      1706 1EA3      CON      PHL_ESTIMATE      TF082940
                                     TF082950
                                     082960
                                     *082970
                                     *082980
                                     *082990
                                     *083000
                                     *083010
                                     083020
                                     083030
                                     083040
                                     083050
                                     083060
                                     083070
                                     *083080
                                     083090
                                     083100
                                     083110
                                     083120
                                     083130

* THIS ROUTINE MULTIPLIES A 3X3 MATRIX (R) BY A VECTOR U TO GET A NEW
* VECTOR X. THE ARGUMENTS CONSIST OF POINTERS TO R, U AND X.

* MATRIX 3 - MULTIPLY 3X3 MATRIX (POINTER IN R2) DOUBLE
* INTO 3-VECTOR (POINTER IN R1) PRECISION
* ANSWER TO (POINTER IN R0) ARITHMETIC

* TIME: 362 MICROSECONDS
* ALL POINTERS PRUNED

MATRIX_3D FETM 5.4
$1 CLAD 12.8
MPYD 12.7
CLAD X8.2
MPYD X7.2
ADDD 2.0
CLAD X8.4

16R 1707 8454
8R 1708 AE28
26 1709 6A27
34 170A AD82
52 170B 6972
56 170C 8C20
64 170D AD84

X1 = SUM V(I)*R(I), I = 1 TO 3
X2 = SUM V(I)*R(I), I = 1 TO 3
X3 = SUM V(I)*R(I), I = 1 TO 3

WORKING STORAGE (6)
X = VAR
"

```

[illegible]

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REGISTER_OCT:

5112	16R	1728	68A4
5113	32	1729	68E2
5114	48	172A	6860
5115	52	172B	8CA8
5116	56	172C	8CA6
5117	86	172D	D590

10.4
8.2
6.0
10.8
10.6
9

MPYD
MPYD
MPYD
ADDD
ADDD
88K

"U . V = SUM U(I)*V(I), I=1 TO 3
22
11
33+22
33+22+11
PRUNE 10

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DP083570	083580
DP083590	DP083600
DP083610	DP083620
DP083630	083640

*

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EX083650
*H083660
*H083670
EX083680
EX083690
EX083700
EX083710
*H083720
*H083730
*H083740
*H083750
*H083760
*H083770
EX083780
EX083790
EX083800
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EX083950
EX083960
EX083970
EX083980
EX083990
EX084000
EX084010
EX084020
EX084030
EX084040
EX084050
EX084060
EX084070
```

OMEGA TASK

PIN ROUTINE TO SET UP THE ADDRESS AND TIME OF THE NEXT OMEGA TASK
THE ROUTINE NUMBER MUST BE IN REGISTER 0
THE CURRENT TIME SHOULD BE IN REGISTERS 1 AND 2
ALL THREE REGISTERS ARE PRUNED OFF WITH THE BBK

THIS PIN ROUTINE SELECTS THE NEXT OMEGA
TASK FROM A TABLE AND COMPUTES THE TIME
OF THE NEXT OMEGA TASK FROM THE TIME
INCREMENT IN THE TABLE

THE ARGUMENTS CONSIST OF A POINTER TO
THE TABLE AND THE CURRENT REAL TIME

OMEGA_TASK_PIN:

5118	2R	172E	8400	ADD	0,0	"READ THE TASK AND TIME INTERVAL
5118	16	172F	F90C028F	FETD	X0,,OMEGA_TASK	TABLE "FROM THE TASK TABLE
5119	24	1731	7019 (0099)	STA	0,,OMEGA_TASK	"SAVE THE ADDRESS OF THE NEXT
5120						"OMEGA TASK FOR THE 5 MILLISEC
						"INTERRUPT PROGRAM
5121	26	1732	9C00	CLAM	0,0	"ADD TIME TO THE TIME INCREMENT
5122	30	1733	8C03	ADD	0,3	"TO GET THE TIME OF THE NEXT
5123	40	1734	7817 (0097)	STAD	0,,OMEGA_TIME	"OMEGA TASK AND SAVE FOR THE 5
5124	44	1735	FC194000	CLAM	1,,X(4000)	"MSEC INTERRUPT PROGRAM
						"USE PROGRAM FLAG C TO DEFINE
						"RHO-RHO (C FALSE) OR PHASE
						"DIFFERENCE (C TRUE) NAVIGATION
						"
						"--SUBMARINE ALWAYS OPERATES IN--EX083930
						"---PHASE DIFFERENCE NAVIGATION--
						"
						"A MODE CHANGE CAN ONLY OCCUR
						"FROM THE PROGRAM MONITOR UNIT
						"
						"SET UP MASK TO MAKE FLAG C FALSEEX083980
5125	50	1737	9E4A (00CA)	CLA	0,,MODE	"IS THE MODE SET FOR RHO-RHO?
5126	54	1738	D011 (173A)	BNE	\$1	"PHASE DIFFERENCE"
5127	2R	1739	A401	CLA	0,1	"SET UP MASK TO MAKE FLAG C TRUE
						"SET SELECTED STATE OF FLAG C IN
5128	12R	173A	E1E10000	MRG	X14,1,0	"THE APPROPRIATE BIT IN THE
						"INDICATOR WORD OF THE R14
						"SUBROUTINE RETURN PUSHDOWN STACKEX084060
						"AFTER EXITING THIS PIN ROUTINE
						EX084070

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5129 32 173C D540 B8K 4

5130 173D 0F00 CON X(0F00)

POSITION VECTOR

* THIS ROUTINE COMPUTES A 3 ELEMENT POSITION VECTOR FROM LATITUDE AND LONGITUDE ARGUMENTS

* GENERATE POSITION VECTOR FROM DESTINATION NUMBER (0 TO 9) IN RO

REGISTERS MADE: SIN LAT, COS LAT, COS LONG, COS LAT, SIN LONG

MAKE_DESTINATION_VECTOR:

PLOT1 173E F90C1FC4 14R 1740 1400

1741 F94C1FDE 14R 1743 1400

1744 8C00 452 1745 6860

1746 6840 484 1747 0510

1748 0510 498

* SUN CONSTANTS CALCULATED FOR JULIAN DAY NUMBER 2,444,317.5

* JANUARY 1.0, 1972 @ 0000 HOURS GMT

* K2 IS LONGITUDE OF MEAN SUN = 279.75764 DEGREES*PI/180

SUN_CONS CON F((-2.)*3.141594*.882691926)/3.14159 K2

*K1=2PI/NUMBER OF DAYS IN TROPICAL YEAR = 365.2421943 DAYS

CON F((.0172027915)/3.141592658-7) K1

*K3=2PI/NUMBER OF DAYS IN ANOMALISTIC YEAR = 365.2596435 DAYS

CON F((.0172019697)/3.141592658-7) K3

* K5 = SIN(E) E = OBLIQUITY OF ECLIPTIC = 23.44292452 DEGREES

CON F(0.397835337) K5

*K4 = MEAN ANOMALY = 357.29877 DEGREES*PI/180

CON F((-2.)*3.141594*.236039932)/3.14159 K4

*K6 = ECCENTRICITY OF ORBIT 0.01672087925*2

CON F((0.0334417585)/3.141598-1) K6

*K7 = TAN*2(E/2) *(-1)

CON F((-0.0430482519)/3.141598-1) -K7

VELOCITY MAGNITUDE

*084480

*084490

*084500

EX084080

EX084090

EX084100

EX084110

084120

084130

*084140

*084150

*084160

*084170

*084180

CI084190

CI084200

CI084210

084220

CI084230

084240

084250

084260

084270

CI084280

CI084290

084300

084310

084320

084330

084340

084350

084360

084370

084380

084390

084400

084410

084420

084430

084440

084450

084460

084470

084480

*084490

*084500

[illegible]

5172	176E 0007	*HX0007	CON	X(0007)	084940
5173	176F 0004AC6A	*			084950
5174	1771 0004AA7D	OCAY_GNE	COND	F((((2070-8)*.9974)*217.021)*1)/3.141593) 10.2 PP084970	084960
5175	1773 0004A411		COND	F((((1550-8)*.9974)*217.021)*4)/3)/3.141593) 1PP084980	
			COND	F((((1850-8)*.9974)*217.021)*101/9)/3.141593) PP084990	
5176	1775 001F	*HX001F	CON	X(001F)	085000
5177		*			085010
5178	1776 0000084A	POS_NOISE_TABLE:	COND	F(.5*.5*6076*6076/2.0950+7/2.0950+78-6) A	085020
5179	1778 000468F5		COND	F(5*5*6076*6076/2.0950+7/2.0950+78-6) 8	DP085030
	177A 00468F4F		COND	F(20*20*6076*6076/2.0950+7/2.0950+78-6) C	DP085050
5180	177C 03C0	*NOISE = 64*(NMI/R)**2	COND	FOLLOW BY X(000F) MASK FOR LOP	DP085070
5181	177D 000F	HD03C0	CON	X(03C0)	085080
5182	177E 6000	HX000F	CON	X(000F)	085090
5183	177F 00FF	HX6000	CON	X(6000)	HM085100
5184	1780 2010	HX00FF	CON	X(00FF)	HM085110
		HX2010	CON	X(2010)	HM085120
5185	1781 1EF6	*			085130
5186	1782 1EFC	CALIBRATE_DATA_ADDRESSES:	CON	CALIBRATE_DATA C3 DATA	ES085140
5187	1783 1F02		CON	CALIBRATE_DATA+6 C2 DATA	ES085150
5188	1784 1F08		CON	CALIBRATE_DATA+12 C1 DATA	ES085160
			CON	CALIBRATE_DATA+18 C4 DATA	ES085170
5189	1785 00000320	LEAP_SECOND:	LITO	800	ES085180
				JAN 1 1975 VALUE (4 SECONDS)	085190
5190	1787 0032	BURST_ADDRESSES:	CON	Q_SUB_T	11 085200
5191	1788 1EF3		CON	PHI_ZERO	01 085210
5192	1789 0024		CON	SIGMA_SQUARED_PHI_SUB_M	085220
5193	178A 1EED		CON	PHI_SUB_M	ES085230
5194	178E F000		CON	X(F000)	ES085240
5195	178C 0FFF	HX0000	CON	X(DFFF)	ES085250
		HX00FF	CON		ES085260
5196	178D 0010	ANTENNA_NOISE_AND_CALIBRATE_CODES:	CON	X(0010)	ES085270
5197	178E 0001		CON	X(0001)	085280
5198	178F 0060		CON	X(0060)	085290
5199	1790 0001		CON	X(0001)	085300
				LOOP A	085310
				LOOP A	ES085320
					ES085330
					ES085340
					ES085350
					ES085360

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SV085460

* OMEGA TRANSMITTER COORDINATES ARE REFERENCED TO THE MERCURY DATUM
* ON THE FISHER 1960 ELLIPSOID (F = 1/298.3, REQ = 6378166. METERS)
* GEOCENTRIC DIRECTION COSINES AND GEODETIC LAT/LONG

STATION_VECTOR_TABLE:

5207	1798	752F9400	COND	F(+.91551829)	NORWAY	=STATION A	085510
5207	1790	3223FD86	COND	F(+.39172334)	LAT = N 66 25 15.00		085520
5208	179F	08B77EC7	COND	F(+.09153733)	LONG = E 13 09 10.00		085530
5209	17A1	179D8080	COND	F(+.18449565)	TRINIDAD	=STATION B	085540
5210	17A3	38C26F26	COND	F(+.46687116)	LAT = N 10 42 06.20		085550
5211	17A5	914C14AC	COND	F(+.86486570)	LONG = W 61 38 20.30		085560
5212	17A7	2E714E36	COND	F(+.36283281)	HAWAII	=STATION C	085570
5213	17A9	918A30F1	COND	F(+.86296869)	LAT = N 21 24 16.90		085580
5214	17AB	D2FE1498	COND	F(+.35162108)	LONG = W 157 49 52.70		085590
5215	17AD	5C5837FA	COND	F(+.72144222)	NORTH DAKOTA	=STATION D	085600
5216	17AF	F326652F	COND	F(+.10039077)	LAT = N 46 21 57.20		085610
5217	17B1	A84C85E6	COND	F(+.68515898)	LONG = W 98 20 08.77		085620
5218	17B3	D27368C3	COND	F(+.35585299)	ILE DE LA REUNION	=STATION E	085630
5219	17B5	441D7343	COND	F(+.53214875)	LAT = S 20 58 26.47		085640
5220	17B7	62558D91	COND	F(+.76823587)	LONG = E 55 17 24.25		085650
5221	17B9	A8EE3E21	COND	F(+.68022941)	ARGENTINA	=STATION F	085660
5222	1788	275E3392	COND	F(+.30756230)	LAT = S 43 03 12.53		085670
5223	178D	AAD58E4E	COND	F(+.66535207)	LONG = W 65 11 27.69		085680
5224			COND	* NEW YORK IS INTERMITTENTLY RADIATING IN THE G SLOT			085690
5225	17BF	57B52B30	COND	F(+.68521633)	NEW YORK	=STATION G	085700
5226	17C1	17FE6764	COND	F(+.18745129)	LAT = N 43 26 40.92		085710
5227	17C3	A5E98008	COND	F(+.70380437)	LONG = W 75 05 09.80		085720
5228	17C5	4861680F	COND	F(+.56547261)	TSUSHIMA ISLAND	=STATION H	085730
5229	17C7	8CEA4FEA	COND	F(+.52409936)	LAT = N 34 36 53.26		085740
5230	17C9	51830A06	COND	F(+.63683639)	LONG = E 125 27 12.49		085750
							085760

5231	17C8 028F	PHI_ZERO_0	CON	F(11.0)/50)	10.2	RECEIVER INPUT	ES085780
5232	17CC 03D7		CON	F(11.5)/50)	13.6	PHASE	ES085790
5233	17CD 03D7		CON	F(11.5)/50)	11.3	SHIFT	ES085800
5234	17CE E664	PHI_ZERO_FLGATER;	CON	X(E664)	90	CEC'S	ES085810
5235	17CF 2E15		CON	X(2E15)	18	CEC'S	ES085820
5236	17D0 051F		CON	X(031F)	02	CEC'S	ES085830
5237	17D1 026F	* PHI_ZERO_LOOP;	CON	F(1-17.8)/50)			ES085840
5238	17D2 1917		CON	F(19.8)/50)			ES085850
5239	17D3 F168		CON	F(1-5.7)/50)			ES085860
5240	17D4 0C00	OVERLAY	CON	0		ECS WORD FOR OVERLAYS	ES085870
5241	17D5 0021	ASCII	CON	X(0021)	A		ES085880
5242	17D6 0022		CON	X(0022)	B		ES085890
5243	17D7 0023		CON	X(0023)	C		085900
5244	17D8 0024		CON	X(0024)	D		085910
5245	17D9 0025		CON	X(0025)	E		085920
5246	17DA 0026		CON	X(0026)	F		085930
5247	17DB 0027		CON	X(0027)	G		085940
5248	17DC 0028		CON	X(0028)	H		085950

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5253	IC03	HEADING_GROUP:	BSS	1	085060
5254	IC04	TYPE_OUT	BSS	1	085070
5255	IC05	DB_CKSUM_IGNORE:	BSS	1	085080
5256	IC06	KAL_TEMP	BSS	1	085090
5257	IC06	CALIBRATE_FAIL_COUNT:	BSS	18	086100
5258	IC13	XXX	BSS	6	086110
5259	IC1E	SYNC_DATA	EQU	9	086120
5260	IC1E	SYNC_C	EQU	XXX	086130
5261	ICAE	SYNC_COUNT	EQU	XXX	086140
5262	IC7A	SYNC_BASE	EQU	9	086150
5263	IC7A	SYNC_DATA_COUNTER:	EQU	XXX	086160
5264	IC7D	XXX	BSS	9	086170
5265	IC27	PROP_PRED_RESULTS:	EQU	120	086180
5266	IC63	AUR_SAVE	EQU	X+60	086190
5267	IC80	SEASON_INDEX_NORTH:	BSS	X+89	086200
5268	IC9F	SEASON_INDEX_SOUTH:	BSS	1	086210
5269	ICA0	PROP_C	BSS	1	086220
5270	ICA1	PP_THETA3	BSS	OS#3	086230
5271	IC89	ERROR_NORTH	BSSD	OS#3	086240
5272	ICD1	ERROR_EAST	EQU	2	086250
5273	ICD5	BI	BSS	19	086260
5274	ICE8	XXXX	BSS	5	086270
5275	ICED	XX	BSS	9	086280
5276	ICF6	X2XX	BSS	9	086290
5277	ICFF	MISFIRE_CNT	BSS	1	086300
5278	ID00	SIGMA_SQ_KICK:	BSSD	1	086310
5279	ID02	RES3	BSSD	1	086320
5280	ID04	RES2	BSSD	1	086330
5281	ID06	P44_INC_RATE:	BSS	1	086340
5282	ID07	DF_COUNTER	BSS	OS	086350
5283	ID0F	PP_THETA2	BSS	OS	086360
5284	ID17	P_MATRIX	BSSD	81	086370
5285	ID17	P11	EQU	P_MATRIX	086380
					086390
					086400
					086410
					086420
					086430
					086440
					086450
					086460
					086470
					086480

WEIGHTING_MATRIX + CODE
SAVE AVERAGE P1,P2,P3,V2,V3
WORKING STORAGE

COVARIANCE_MATRIX

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5286	1D19	P12	EQ	P_MATRIX+2	PAGE 251
5287	1D18	P13	EQ	P_MATRIX+4	CF086490
5288	1D1D	P14	EQ	P_MATRIX+6	CF086500
5289	1D1F	P15	EQ	P_MATRIX+8	CF086510
5290	1D21	P16	EQ	P_MATRIX+10	CF086520
5291	1D23	P17	EQ	P_MATRIX+12	CF086530
5292	1D25	P18	EQ	P_MATRIX+14	CF086540
5293	1D27	P19	EQ	P_MATRIX+16	CF086550
5294	1D29	P21	EQ	P_MATRIX+18	CF086560
5295	1D28	P22	EQ	P_MATRIX+20	CF086570
5296	1D2D	P23	EQ	P_MATRIX+22	CF086580
5297	1D2F	P24	EQ	P_MATRIX+24	CF086590
5298	1D31	P25	EQ	P_MATRIX+26	CF086600
5299	1D33	P26	EQ	P_MATRIX+28	CF086610
5300	1D35	P27	EQ	P_MATRIX+30	CF086620
5301	1D37	P28	EQ	P_MATRIX+32	CF086630
5302	1D39	P29	EQ	P_MATRIX+34	CF086640
5303	1D38	P31	EQ	P_MATRIX+36	CF086650
5304	1D3D	P32	EQ	P_MATRIX+38	CF086660
5305	1D3F	P33	EQ	P_MATRIX+40	CF086670
5306	1D41	P34	EQ	P_MATRIX+42	CF086680
5307	1D43	P35	EQ	P_MATRIX+44	CF086690
5308	1D45	P36	EQ	P_MATRIX+46	CF086700
5309	1D47	P37	EQ	P_MATRIX+48	CF086710
5310	1D49	P38	EQ	P_MATRIX+50	CF086720
5311	1D4B	P39	EQ	P_MATRIX+52	CF086730
5312	1D4D	P41	EQ	P_MATRIX+54	CF086740
5313	1D4F	P42	EQ	P_MATRIX+56	CF086750
5314	1D51	P43	EQ	P_MATRIX+58	CF086760
5315	1D53	P44	EQ	P_MATRIX+60	CF086770
5316	1D55	P45	EQ	P_MATRIX+62	CF086780
5317	1D57	P46	EQ	P_MATRIX+64	CF086790
5318	1D59	P47	EQ	P_MATRIX+66	CF086800
5319	1D5B	P48	EQ	P_MATRIX+68	CF086810
5320	1D5D	P49	EQ	P_MATRIX+70	CF086820
5321	1D5F	P51	EQ	P_MATRIX+72	CF086830
5322	1D61	P52	EQ	P_MATRIX+74	CF086840
5323	1D63	P53	EQ	P_MATRIX+76	CF086850
5324	1D65	P54	EQ	P_MATRIX+78	CF086860
5325	1D67	P55	EQ	P_MATRIX+80	CF086870
5326	1D69	P56	EQ	P_MATRIX+82	CF086880
5327	1D6B	P57	EQ	P_MATRIX+84	CF086890
5328	1D6D	P58	EQ	P_MATRIX+86	CF086900
					CF086910

MDQ	36	05/18/76	AN/3RN-7	EQ	P_MATRIX+88	PAGE 255
5329	1D6F	P59	EQ	P_MATRIX+88	CF086920	
5330	1D71	P61	EQ	P_MATRIX+90	CF086930	
5331	1D73	P62	EQ	P_MATRIX+92	CF086940	
5332	1D75	P63	EQ	P_MATRIX+94	CF086950	
5333	1D77	P64	EQ	P_MATRIX+96	CF086960	
5334	1D79	P65	EQ	P_MATRIX+98	CF086970	
5335	1D7B	P66	EQ	P_MATRIX+100	CF086980	
5336	1D7D	P67	EQ	P_MATRIX+102	CF086990	
5337	1D7F	P68	EQ	P_MATRIX+104	CF087000	
5338	1D81	P69	EQ	P_MATRIX+106	CF087010	
5339	1D83	P71	EQ	P_MATRIX+108	CF087020	
5340	1D85	P72	EQ	P_MATRIX+110	CF087030	
5341	1D87	P73	EQ	P_MATRIX+112	CF087040	
5342	1D89	P74	EQ	P_MATRIX+114	CF087050	
5343	1D8B	P75	EQ	P_MATRIX+116	CF087060	
5344	1D8D	P76	EQ	P_MATRIX+118	CF087070	
5345	1D8F	P77	EQ	P_MATRIX+120	CF087080	
5346	1D91	P78	EQ	P_MATRIX+122	CF087090	
5347	1D93	P79	EQ	P_MATRIX+124	CF087100	
5348	1D95	P81	EQ	P_MATRIX+126	CF087110	
5349	1D97	P82	EQ	P_MATRIX+128	CF087120	
5350	1D99	P83	EQ	P_MATRIX+130	CF087130	
5351	1D9B	P84	EQ	P_MATRIX+132	CF087140	
5352	1D9D	P85	EQ	P_MATRIX+134	CF087150	
5353	1D9F	P86	EQ	P_MATRIX+136	CF087160	
5354	1DA1	P87	EQ	P_MATRIX+138	CF087170	
5355	1DA3	P88	EQ	P_MATRIX+140	CF087180	
5356	1DA5	P89	EQ	P_MATRIX+142	CF087190	
5357	1DA7	P91	EQ	P_MATRIX+144	CF087200	
5358	1DA9	P92	EQ	P_MATRIX+146	CF087210	
5359	1DA8	P93	EQ	P_MATRIX+148	CF087220	
5360	1DAD	P94	EQ	P_MATRIX+150	CF087230	
5361	1DAF	P95	EQ	P_MATRIX+152	CF087240	
5362	1DB1	P96	EQ	P_MATRIX+154	CF087250	
5363	1DB3	P97	EQ	P_MATRIX+156	CF087260	
5364	1DB5	P98	EQ	P_MATRIX+158	CF087270	
5365	1DB7	P99	EQ	P_MATRIX+160	CF087280	
		*			CF087290	
		*			087300	
		*			087310	
5366	1DB9	N_CTR_SAVE	BSSD	1	087320	
5367		SIGMA_SQ_N_COUNTER;			087330	
5367	1DB9	BSS		QS*3	087340	

5374	1E03	Q_STORAGE BSS	24	087470
5375	1E0B	AVIONICS BSSD	1	MT087480
5376	1EED	PHI_SUB_M BSSD	3	087490
5377	1EF3	PHI_ZERC BSS	3	087500
5378		CALIBRATE_DATA:		087510
5378	1EF6	BSS	24	087520
5379	1F08	NOISE_DATA EQU	CALIBRATE_DATA+18	087530
5380		END_OF_BURST_DATA:		087540
5380	1F08	EQU	CALIBRATE_DATA+18	087550
5381		PHI_DOT_DR_BASE:		087560
5381	1F0E	BSS	9	087570
5382	1F17	BURST_TIME BSSD	1	087580
5383		SS_PHI_M_BASE:		087590
5383	1F19	BSSD	3	087600
5384	1F1F	PHI_M_BASE BSSD	3	087610
5385	1F25	RAW_H BSSD	3	087620
5386		DELTA_THETA_2:		RU087630
5386	1F28	BSSD	2	RU087640
5387		DELTA_THETA_3:		RU087650
5387	1F2D	EQU	DELTA_THETA_2+2	RU087660
5388	1F2F	MODE_CHANGE BSS	1	087670
5389		BEARING_TEMPS:		087680
5389	1F30	BSSD	6	087690
5390	1F3C	PHI_OFFSET BSS	1	**087700
5391	1F3D	IMAGE11 BSS	2	CI087710
5392	1F3E	IMAGE12 EQU	IMAGE11+1	CI087720
5393	1F3F	IMAGE13 BSS	1	CI087730
		* CONTROL AND INDICATOR VARIABLES		087740
		* ORDER CRITICAL - DO NOT DISTURB		087750
5394	1F40	CALLWORD BSS	1	CI087760
5395	1F41	ARGWORD1 BSS	1	CI087770
5396	1F42	ARGWORD2 BSS	1	CI087780
5397	1F43	LINKWORD BSS	1	CI087790
5398	1F44	PROWORD BSS	1	CI087800
5399	1F45	PANELTIME BSSD	1	CI087810
5400	1F47	PANELMODE BSS	4	CI087820
		* END OF ORDERED VARIABLES		CI087830
		* START - CRITICALLY ORDERED STORAGE		087840
		* V_TAS_STAR BSS	1	087850
5401	1F48			087860
				087870
				087880

[illegible]

MOD	36	05/18/76	AN/BRN-7	12	PAGE 256
5432	IFA 6	Y_P	BSS	12	088320
5433	IFB 2	RZ_C	BSSD	3	088330
5434	IFB 8	RZ_PCS	BSSD	3	088340
5435	IFB E	RZ_BETA	BSSD	3	088350
5436		DESTINATION_LONGITUDE:			088360
5436	IFC 4		BSSD	26	088370
5437		DESTINATION_LATITUDE:			088380
5437	IFDE		EQU		088390
5438		INTERCEPT_LAT:			088400
5438	IFF 6		EQU		088410
5439		INTERCEPT_LONG:			088420
5439	IFDC		EQU		088430
5440	IFD 8		EQU		088440
5441	IFF 2	RZ_TIME	EQU		088450
5442	IFDA	RZ_RATE	EQU		088460
5443	IFD 8	RZ_ALPHA	EQU		088470
5444	IFF 4	RZ_VEL	EQU		088480
5445		V_INSERT	EQU		088490
		DB_WAT	BSS	8	

CONDUCTIVITY TABLE

5446	170D	FFFFF	LAT_N85_N90	COND	X(FFFFF)	CT088540
5447	170F	F700		CON	X(F700)	CT088510
5448	17E0	FFFFF9C	LAT_N80_N85	COND	X(FFFFF9C)	CT088520
5449	17E2	8AA78598		COND	X(8AA78598)	CT088530
5450	17E4	776579F7		COND	X(776579F7)	CT088540
5451	17E6	DF5ECCF2	LAT_N75_N80	COND	X(DF5ECCF2)	CT088550
5452	17E8	D78A8DFF		COND	X(D78A8DFF)	CT088560
5453	17EA	F7CC888C		COND	X(F7CC888C)	CT088570
5454	17EC	ABA8D832		COND	X(ABA8D832)	CT088580
5455	17EE	0000002F		COND	X(0000002F)	CT088590
5456	17F0	5CE0		CCN	X(5CE0)	CT088600
5457	17F1	EEF3CCF0	LAT_N70_N75	COND	X(EEF3CCF0)	CT088610
5458	17F3	D0897774		COND	X(D0897774)	CT088620
5459	17F5	65898DCA		COND	X(65898DCA)	CT088630
5460	17F7	80DF7EEF		COND	X(80DF7EEF)	CT088640
5461	17F9	459A9CCC		COND	X(459A9CCC)	CT088650
5462	17FB	8778F260		COND	X(8778F260)	CT088660
5463	17FD	0002EF70		COND	X(0002EF70)	CT088670
5464	17FF	9898DC88		COND	X(9898DC88)	CT088680
5465	1801	97A88865	LAT_N65_N70	COND	X(97A88865)	CT088690
5466	1803	65557777		COND	X(65557777)	CT088700
5467	1805	77778767		COND	X(77778767)	CT088710
5468	1807	BCF09773		COND	X(BCF09773)	CT088720
5469	1809	89999756		COND	X(89999756)	CT088730
5470	180B	66698E87		COND	X(66698E87)	CT088740
5471	180D	CF0E003A		COND	X(CF0E003A)	CT088750
5472	180F	80DF4D90		COND	X(80DF4D90)	CT088760
5473	1811	A99A8AA8	LAT_N60_N65	COND	X(A99A8AA8)	CT088770
5474	1813	9A999987		COND	X(9A999987)	CT088780
5475	1815	67777777		COND	X(67777777)	CT088790
5476	1817	677A89AC		COND	X(677A89AC)	CT088800
5477	1819	F1EB9999		COND	X(F1EB9999)	CT088810
5478	181B	95998777		COND	X(95998777)	CT088820
5479	181D	4900D88F		COND	X(4900D88F)	CT088830
5480	181F	256F2EDF		COND	X(256F2EDF)	CT088840
5481	1821	3C88		CON	X(3C88)	CT088850
5482	1822	C9ABAAA9	LAT_N55_N60	COND	X(C9ABAAA9)	CT088860
5483	1824	9AAAAA88		COND	X(9AAAAA88)	CT088870
5484	1826	86645559		COND	X(86645559)	CT088880

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5485	1828	DEEBCF5E	COND	X (DEEBCF5E)	CT088930
5486	182A	CD1D899	COND	X (CD1D899)	CT088940
5487	182C	9865B0CF	COND	X (9865B0CF)	CT088950
5488	182E	0857AFAA	COND	X (0857AFAA)	CT088960
5489	1830	F008D000	COND	X (F008D000)	CT088970
5490	1832	AA8AAA9	COND	X (AA8AAA9)	CT088980
5491	1834	9AAAAA76	COND	X (9AAAAA76)	CT088990
5492	1836	7755566A	COND	X (7755566A)	CT089000
5493	1838	EF1CFCE8	COND	X (EF1CFCE8)	CT089010
5494	183A	99AAA977	COND	X (99AAA977)	CT089020
5495	183C	897878F8	COND	X (897878F8)	CT089030
5496	183E	DDE8A800	COND	X (DDE8A800)	CT089040
5497	1840	AA8BA88A	COND	X (AA8BA88A)	CT089050
5498	1842	8AAAA977	COND	X (8AAAA977)	CT089060
5499	1844	6689789C	COND	X (6689789C)	CT089070
5500	1846	EFF188A	COND	X (EFF188A)	CT089080
5501	1848	AA989877	COND	X (AA989877)	CT089090
5502	184A	7E9CF8CA	COND	X (7E9CF8CA)	CT089100
5503	184C	A9A0	CGN	X (A9A0)	CT089110
5504	184D	98DDAC08	COND	X (98DDAC08)	CT089120
5505	184F	BAA9AAAA	COND	X (BAA9AAAA)	CT089130
5506	1851	AAA8A7DF	COND	X (AAA8A7DF)	CT089140
5507	1853	0DFFF198	COND	X (0DFFF198)	CT089150
5508	1855	A98AAA6A	COND	X (A98AAA6A)	CT089160
5509	1857	AF8C8CDC	COND	X (AF8C8CDC)	CT089170
5510	1859	8000	CGN	X (8000)	CT089180
5511	185A	EC8999A9	COND	X (EC8999A9)	CT089190
5512	185C	A789999	COND	X (A789999)	CT089200
5513	185E	AA8F08F	COND	X (AA8F08F)	CT089210
5514	1860	0DEFFF1D	COND	X (0DEFFF1D)	CT089220
5515	1862	A6ABAAC9	COND	X (A6ABAAC9)	CT089230
5516	1864	CFCCEDEF	COND	X (CFCCEDEF)	CT089240
5517	1866	1000	CGN	X (1000)	CT089250
5518	1867	DEEA99A	COND	X (DEEA99A)	CT089260
5519	1869	AAA89999	COND	X (AAA89999)	CT089270
5520	186B	AAAAEF0E	COND	X (AAAAEF0E)	CT089280
5521	186D	FFF488AA	COND	X (FFF488AA)	CT089290
5522	186F	ABA8EFC8	COND	X (ABA8EFC8)	CT089300
5523	1871	AAADE000	COND	X (AAADE000)	CT089310
5524	1873	AA8898DB	COND	X (AA8898DB)	CT089320
5525	1875	AAAA9999	COND	X (AAAA9999)	CT089330
5526	1877	9A99EFFF	COND	X (9A99EFFF)	CT089340
5527	1879	7CAADF1C	COND	X (7CAADF1C)	CT089350

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5528	1878	FCC9AAAA	COND	X (FCC9AAAA)	CT089360
5529	1879	A000	CGN	X (A000)	CT089370
5530	187E	AA9C7AAC	CCND	X (AA9C7AAC)	CT089380
5531	1880	F0EA998C	CGND	X (F0EA998C)	CT089390
5532	1882	A98C0FFF	CGND	X (A98C0FFF)	CT089400
5533	1884	8EC9CFOE	CGND	X (8EC9CFOE)	CT089410
5534	1886	FCEA9A89	CGND	X (FCEA9A89)	CT089420
5535	1888	A900	CGN	X (A900)	CT089430
5536	1889	998ABACE	CGND	X (998ABACE)	CT089440
5537	1888	F1C9CFOE	CGND	X (F1C9CFOE)	CT089450
5538	188D	BACF1EFF	CGND	X (BACF1EFF)	CT089460
5539	188F	F9CC0DFC	CGND	X (F9CC0DFC)	CT089470
5540	1891	EAAA98AA	CGND	X (EAAA98AA)	CT089480
5541	1893	7998ADF4	CGND	X (7998ADF4)	CT089490
5542	1895	9F2EC8F1	CGND	X (9F2EC8F1)	CT089500
5543	1897	EFF8EDD	CGND	X (EFF8EDD)	CT089510
5544	1899	F0DEEF7C	CGND	X (F0DEEF7C)	CT089520
5545	1898	99899AA0	CGND	X (99899AA0)	CT089530
5546	189D	8A898F4	CGND	X (8A898F4)	CT089540
5547	189F	EEF2EF1E	CGND	X (EEF2EF1E)	CT089550
5548	18A1	EFFFDEC9	CGND	X (EFFFDEC9)	CT089560
5549	18A3	98CF7C77	CGND	X (98CF7C77)	CT089570
5550	18A5	A879	CGN	X (A879)	CT089580
5551	18A6	8778AEF8	CGND	X (8778AEF8)	CT089590
5552	18A8	EDF0C0FF	CGND	X (EDF0C0FF)	CT089600
5553	18AA	FCA8779	CGND	X (FCA8779)	CT089610
5554	18AC	FAE78000	CGND	X (FAE78000)	CT089620
5555	18AE	9878EFAB	CGND	X (9878EFAB)	CT089630
5556	18B0	F0CEEFOE	CGND	X (F0CEEFOE)	CT089640
5557	18B2	CEFF9EA	CGND	X (CEFF9EA)	CT089650
5558	18B4	A999988E	CGND	X (A999988E)	CT089660
5559	18B6	F889	CGN	X (F889)	CT089670
5560	18B7	9578FCEE	CGND	X (9578FCEE)	CT089680
5561	18B9	F3EC0FFF	CGND	X (F3EC0FFF)	CT089690
5562	18BB	9AA9979	CGND	X (9AA9979)	CT089700
5563	18BD	98F8B900	CGND	X (98F8B900)	CT089710
5564	18BF	A877F00F	CGND	X (A877F00F)	CT089720
5565	18C1	EEAD0FFF	CGND	X (EEAD0FFF)	CT089730
5566	18C3	AC9A99A8	CGND	X (AC9A99A8)	CT089740
5567	18C5	8EF8C900	CGND	X (8EF8C900)	CT089750
5568	18C7	A98BF09F	CGND	X (A98BF09F)	CT089760
5569	18C9	DC89AAEF	CGND	X (DC89AAEF)	CT089770
5570	18CB	FFAC89AA	CGND	X (FFAC89AA)	CT089780

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5571	18CD	98EF8AA0				X(98EF8AA0)	CT089790
5572	18CF	A8AF0EAF		LAT_S25_S20	CQND	X(1A8AF0EAF)	CT089800
5573	18D1	8E88AAAA			CQND	X(8E88AAAA)	CT089810
5574	18D3	8EFFFF9E8			CQND	X(8EFFFF9E8)	CT089820
5575	18D5	AAA9AF9D			CQND	X(1AA9AF9D)	CT089830
5576	18D7	9000			CQND	X(9000)	CT089840
5577	18D8	59CFEE87		LAT_S30_S25	CQND	X(99CFEE87)	CT089850
5578	18DA	AAAAACFF			CQND	X(1AAAAACFF)	CT089860
5579	18DC	F9E7AAAD			CQND	X(F9E7AAAD)	CT089870
5580	18DE	F8A0			CQND	X(F8A0)	CT089880
5581	18DF	ACFF08A		LAT_S35_S30	CQND	X(1ACFF08A)	CT089890
5582	18E1	DDAA90FF			CQND	X(1DDAA90FF)	CT089900
5583	18E3	FAC9AABF			CQND	X(FAC9AABF)	CT089910
5584	18E5	8D00			CQND	X(8D00)	CT089920
5585	18E6	FFF7C8F3		LAT_S40_S35	CQND	X(FFF7C8F3)	CT089930
5586	18E8	EEFF58A			CQND	X(EEFF58A)	CT089940
5587	18EA	80F0			CQND	X(80F0)	CT089950
5588	18EB	FFF8EF3D		LAT_S45_S40	CQND	X(FFF8EF3D)	CT089960
5589	18ED	FFF68AFF			CQND	X(FFF68AFF)	CT089970
5590	18EF	FFCEFFF		LAT_S50_S45	CQND	X(FFCEFFF)	CT089980
5591	18F1	790FF000			CQND	X(790FF000)	CT089990
5592	18F3	FFFFFFF5		LAT_S55_S50	CQND	X(FFFFFFF5)	CT090000
5593	18F5	BEFF			CQND	X(8EFF)	CT090010
5594	18F6	FFFFF300		LAT_S60_S55	CQND	X(FFFFF300)	CT090020
5595	18F8	FFFFF300		LAT_S65_S60	CQND	X(FFFFF300)	CT090030
5596	18FA	F1A89D76		LAT_S70_S65	CQND	X(F1A89D76)	CT090040
5597	18FC	4566ADFC			CQND	X(4566ADFC)	CT090050
5598	18FE	8F70			CQND	X(8F70)	CT090060
5599	18FF	3213310		LAT_S75_S70	CQND	X(3213310)	CT090070
5600	1901	000226F			CQND	X(000226F)	CT090080
5601	1903	50ED9994			CQND	X(50ED9994)	CT090090
5602	1905	F3943300			CQND	X(F3943300)	CT090100
5603	1907	0002210		LAT_S80_S75	CQND	X(0002210)	CT090110
5604	1909	0001398			CQND	X(0001398)	CT090120
5605	190B	CCA52211			CQND	X(CCA52211)	CT090130
5606	190D	12348A95			CQND	X(12348A95)	CT090140
5607	190F	2200			CQND	X(2200)	CT090150
5608	1910	00000000		LAT_S85_S80	CQND	X(00000000)	CT090160
5609	1912	00123445			CQND	X(00123445)	CT090170
5610	1914	55532211			CQND	X(55532211)	CT090180
5611	1916	12233333			CQND	X(12233333)	CT090190
5612	1918	2200			CQND	X(2200)	CT090200
5613	1919	00000000		LAT_S90_S85	CQND	X(00000000)	CT090210

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CT090220
CT090230
CT090240
CT090250

X(00223333)
X(33322222)
X(22222222)
X(2100)

MOD 36 05/18/76 AN/BRN-7

COND
COND
COND
CCN

1918 00223333
1910 33322222
191F 22222222
1921 2100

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090260

CT090270

CT090280

CT090290

CT090300

CT090310

CT090320

CT090330

CT090340

CT090350

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CT090370

CT090380

CT090390

CT090400

CT090410

CT090420

CT090430

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CT090470

CT090480

CT090490

CT090500

CT090510

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CT090540

CT090550

CT090560

CT090570

CT090580

CT090590

CT090600

CT090610

CT090620

CT090630

0090640

LAT_S90_S85

LAT_S85_S80

LAT_S80_S75

LAT_S75_S70

LAT_S70_S65

LAT_S65_S60

LAT_S60_S55

LAT_S55_S50

LAT_S50_S45

LAT_S45_S40

LAT_S40_S35

LAT_S35_S30

LAT_S30_S25

LAT_S25_S20

LAT_S20_S15

LAT_S15_S10

LAT_S10_S05

LAT_S05_S00

LAT_N00_N05

LAT_N05_N10

LAT_N10_N15

LAT_N15_N20

LAT_N20_N25

LAT_N25_N30

LAT_N30_N35

LAT_N35_N40

LAT_N40_N45

LAT_N45_N50

LAT_N50_N55

LAT_N55_N60

LAT_N60_N65

LAT_N65_N70

LAT_N70_N75

LAT_N75_N80

LAT_N80_N85

LAT_N85_N90

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1922 1919

1923 1910

1924 1907

1925 18FF

1926 18FA

1927 18F8

1928 18F6

1929 18F3

192A 18EF

192B 18EB

192C 18E6

192D 18DF

192E 18D8

192F 18CF

1930 18C7

1931 18BF

1932 18B7

1933 18AE

1934 18A6

1935 189D

1936 1893

1937 1889

1938 187E

1939 1873

193A 1867

193B 185A

193C 184D

193D 1840

193E 1832

193F 1822

1940 1811

1941 17FF

1942 17F1

1943 17E6

1944 17E0

1945 17D0

1946 C7C

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END_COND_T

END_CKSUM

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1090650

5655	1947		TAPE	4,X(73)	090660
5656	015F		TAPE	3,12	090670
5657	0156		TAPE	4,X(F1)	090680
5658	1947		TAPE	1	090690
5659			SCS		090700
5660			EQU	OMEGA_TASK_TABLE/2	090710
5661			ORG	PROG_IO_DB	090720
5662	0156	0100	CCN	X(0100)	090730
5663	1947		ORG	END_CKSUM+1	090740
5664			OMEGA_DEBUG :		090750
5665	1947	D009 (1951)	18UC	OMEGA_DEBUG_ENTRY	090760
5666	1948	D00F (1958)	18UC	OMEGA_DEBUG_ENTRY\$2	1090770
5667	1949	D510	AD_IQ_TEST 288K	1	2090780
5668	194A	D000	FILL		
5669	194B	D510	GP_TEST 288K	1	3090790
5670	194C	D000	FILL		
	194D	D510	OSC_TEST 288K	1	090800
	194E	D000	FILL		
	194F	0800	OMEGA	SYNCL/2-HOT	5090810
	1950	D5F0	88K	15	6090820

DISPLAY 01 FOR DEBUG ON C_I

```

**
*   DEBUG PROGRAM
*   INCLUDE THE FOLLOWING CONSTANTS
*   HX1000, HX001F, HX007E, HX000F, HX0007
*   HAVE FOLLOWING LABELS:
*   1 ROLL FIRST BSS
*   2 START_CKSUM START OF CHECKSUM AREA
*   3 END_CKSUM CHECKSUM AT END OF CHECKSUM AREA
*   DEBUG USES THE SPACE BETWEEN 1 AND 3
*   REGISTERS USED
*   0 SCRATCH
*   1 CURRENT ADDRESS
*   2 DATA 1
*   3 DATA 2
*   4 HEX-KEY
*   5 UPDATE INDEX
*   6 DISPLAY MODE
*   7 HOLD MARKER
*   8 PATCH ADDRESS
*   9 CORR. ADDRESS
*   OMEGA_DEBUG_ENTRY:
*   CLAD
*   FET
*   SNS
*   BRL
*   IOC
*   PIP
*   CLA
*   COMM
*   BNE
*   CLAM
*   STA
*   BUC
*   DB_DECODE KEYBOARD INPUT
*   EXT
*   EXT
*   COMM
*   BGE
*   COMM
*   BRG
*   HEXADEcimal CHARACTER RECEIVED
*   COMM
*   BRL
*   DB_DECODE
*   EXT
*   EXT
*   COMM
*   BGE
*   COMM
*   BRG
*   7,0,HX1000 BIT 13
*   0,0,HX001F BITS 1 THROUGH 5
*   0,27
*   DB_UPDATE
*   0,15
*   COMM
*   BRG
*   IX0, DB_JUMP_TABLE-16
*   4,0
*   DB_HEX
*   TEST HEX_KEY
*   DISPLAY SELECT

```

090830
 08090840
 090850
 090860
 090870
 090880
 090890
 090900
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 08090920
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 08090990
 08091000
 08091010
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 08091070
 08091080
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 08091100
 08091110
 08091120
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 08091190
 08091200
 08091210
 08091220
 08091230
 08091240
 08091250

MOD	36	05/18/76	AN/BRN-7	BRG	NEW ADDRESS	PAGE 266
4R	1971	0036	(1978)	BRG	\$2	08091260
2R	1972	9C10		CLAM	1,0	08091270
4	1973	9C41		CLAM	4,1	08091280
4R	1974	F414C010		LSA	1,4	08091290
6	1976	B410		ADD	1,0	08091300
10	1977	D008	(1980)	SUC	DB_UPDATE	08091310
2R	1978	S842		CCMM	4,2	08091320
6	1979	D856	(1974)	BRL	\$1	08091330
4R	197A	D032	(197D)	BRG	\$3	08091340
4R	197B	B822		SUBD	2,2	08091350
6	197C	9C43		CLAM	4,3	08091360
6R	197D	FC24C010		LSAD	2,4	08091370
8	197F	B430		ADD	3,0	08091380
				* UPDATE DISPLAY		08091390
8R	1980	F4CF8E30		SNS	PMU_DISPLAY_BUSY	08091400
12	1982	D22F	(1982)	BGE	DB_PNBWES2	08091410
2R	1983	9451		ADDM	5,1	08091420
10	1984	E455176E		EXT	5,5,HX0007	08091430
14	1986	D217	(19AE)	BNE	DB_PNBWES1	08091440
				* FILL DISPLAY BUFFER		08091450
10R	1987	8427		FETM	2,7	08091460
12	1988	9C0C		CLAM	0, ALPHA+BETA	08091470
14	1989	9890		CCMM	TEST MODE	08091480
18	198A	D026	(1991)	BGE	DB_SPECIALS\$4	08091490
8R	198B	F51A1FF8		CLA	X1, DB_WAT	08091500
18	198D	F11700AA		STA	X1, DB_BUFFER	08091510
26	198F	C415	(1988)	BKU	1, DB_SPECIALS	08091520
4R	1990	D10C	(19AD)	BUC	DB_PNBWE	08091530
12R	1991	E050Q0A1		MRG	9,0,PMU_INDICATOR_WORD	08091540
16	1993	D06A	(199E)	BRE	\$1	08091550
2R	1994	9C23		CLAM	SKIP UNLESS WRITE OR PATCH MODE	08091560
14	1995	F85700AE		STAD	2,3	08091570
16	1997	9898		CCMM	5, DB_BUFFER+4	08091580
20	1998	D06A	(19A3)	BRE	9, ALPHA	08091590
10R	1999	F0B700B0		STA	SKIP IF WRITE MODE	08091600
16	199B	A5B0		CLA	11, DB_BUFFER+6	08091610
24	199C	7031	(00B1)	STA	X11,0	08091620
28	199D	D00F	(19AD)	BUC	0, DB_BUFFER+7	08091630
8R	199E	F40A1FFE		BUC	DB_PNBWE	08091640
14	19A0	9A7C	(00FC)	CCMM	0, DB_WAT+6	08091650
18	19A1	D011	(19A3)	BNE	0, DB_ML_ADD	08091660
2R	19A2	9C25		CLAM	\$2	08091670
10R	19A3	F04700B0		STA	2,5	08091680
				* BLOCK CA OVERWRITE		
					PREPARE TO SHOW CA, (CA)	

Address	Value	Field	Comment
5772	190C 9411	1,1	DB092120
5773	190D 7210	11,0	DB092130
5774	190E 9011	1,1	DB092140
5775	190F 9001	0,1	DB092150
5776	19E0 D80F (19D2)	\$8	DB092160
5777	19E1 9E7C (00FC)	\$9	DB092170
5778	19E2 F071FFE	0, DB_ML_ADD	DB092180
5779	19E4 D502 (19D3)	0, DB_WAT+6	DB092190
5780	19E5 9860	\$10	DB092200
5781	19E6 D534 (19D3)	\$6	DB092210
5782	19E7 8C61	\$6, 1	DB092220
5783	19E8 D906 (19D3)	\$6	DB092230
5784	19E9 9411	1,1	DB092240
5785	19EA 5868	6, ALPHA	DB092250
5786	19EB D100 (19FC)	DB_WRITE1\$2	DB092260
5787	19EC 586C	6, ALPHA+BETA	DB092270
5788	19ED 04061980	DB_UPDATE	DB092280
5789	19EF 9C60	6, 0	DB092290
5790	19F0 D90E (19D3)	DB_HEX\$6	DB092300
5791	19F1 A402	0,2	DB092310
5792	19F2 F80D1A28	DB_WRITE	DB092320
5793	19F4 9411	1,1	DB092330
5794	19F5 F80D1A2A	WRITE_DATA	DB092340
5795	19F7 9011	1,1	DB092350
5796	19F8 DC02 (19FB)	DB_WRITE1\$1	DB092360
5797	19F9 F80D1A2A	WRITE_DATA	DB092370
5798	19FB 586C	6, ALPHA+BETA	DB092380
5799	19FC DA5A (19D3)	DB_HEX\$6	DB092390
5800	19FD 9C42	4,2	DB092400
5801	19FE 04001580	DB_UPDATE	DB092410
5802	1A00 5868	6, ALPHA	DB092420
5803	1A01 DA1F (19D3)	DB_PATCH	DB092430
5804	1A02 F01700A0	BNE	DB092440
5805	1A04 C211	1, DB_SAVE	DB092450
5806	1A05 F41700AA	11,1	DB092460
5807	1A07 FC87C031	8, DB_BUFFER	DB092470
5808	1A09 9C6C	8, DB_SAVEPATCHSTART	DB092480
5809	1A0A 9E2A (00AA)	6, ALPHA+BETA	DB092490
5810	1A0B F80D1A28	0, DB_BUFFER	DB092500
5811	1A0D 9E2B (00AB)	0, DB_BUFFER+1	DB092510
5812	1A0E F80D1A28	DB_WRITE	DB092520
5813	1A10 D504 (19FD)	DB_WRITE1\$3	DB092530
5814	1A11 986C	6, ALPHA+BETA	DB092540

WAT DISPLAY - IGNORE IF
WRITE ENABLED

ADVANCE CRNT ADDRESS
TEST FOR WRITE MODE

TEST FOR PATCH MODE

WRITE LEFT HALF

ADVANCE CURRENT ADDRESS
RIGHT HALF

RIGHT HALF
TEST FOR PATCH MODE

SET HEX-KEY FOR DATA

TEST FOR WRITE MODE
IGNORE IF NOT
SAVE CA FOR CLEAR AND RETURN BUC
SAVE LONG INSTRUCTION
IN DISPLAY BUFFER

TRANSPANT SAVED INSTRUCTION

TEST FOR PATCH MODE

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5815	6	1A12	D113	(1A26)	BNE	DB_END_PCH\$2	IF NOT, IGNORE	DB092550
5816	8R *	1A13	F80D1A28		BSV	WRITE_LBUC	BUILD RETURN BUC	DB092560
5817	14	1A15	9E20	(00A0)	CLA	0,,DB_SAVE		DB092570
5818	16	1A16	5402		ADDM	0,,2		DB092580
5819	24 *	1A17	F80D1A28		BSV	DB_WRITE	TEST FOR PATCH MODE	DB092590
5820	2R	1A19	986C		COMM	6,,ALPHA+8ETA	DECREMENT CA IF DISPLAY OR WRITE	DB092600
5821	6	1A1A	D01A	(1A25)	BNE	\$1	FORCE FROM PATCH TO WRITE	DB092610
5822	2R	1A18	9C68		CLAM	6,,ALPHA	RESTORE CA	DB092620
5823	10	1A1C	F41A00A0		CLA	1,,DB_SAVE	BUILD AND PLANT LBUC TO PATCH	DB092630
5824	18 *	1A1E	F80D1A28		BSV	WRITE_LBUC		DB092640
5825	20	1A20	9411		ADDM	1,,1		DB092650
5826	28	1A21	F40A0031		CLA	0,,DB_SAVEPATCH	START LSH OF LBUC	DB092660
5827	36 *	1A23	F80D1A28		BSV	DB_WRITE		DB092670
5828	2R	1A25	9011		SUBM	1,,1	RESTORE OR DECRMNT, MODE DEPNDNT	DB092680
5829	6R	1A26	040019D3		BUC	DB_HEX\$6		DB092690
5830	6R	1A28	9E5F	(000F)	CLA	0,,HX0400		DB092700
5831	10	1A29	D001	(1A2B)	BUC	DB_WRITE		DB092710
5832	2R	1A2A	A403		CLA	0,3		DB092720
5833	2R	1A2B	9868		COMM	6,,ALPHA	TEST MODE	DB092730
5834	6	1A2C	D250	(1A4D)	BRL	\$7	NO WRITE ENABLE	DB092740
5835	4R	1A2D	D064	(1A32)	BRE	\$1		DB092750
5836	6R	1A2E	C008		FET	0,8	PATCH MODE	DB092760
5837	16	1A2F	782C	(00AC)	STAD	0,,DB_BUFFER+2	DISPLAY	DB092770
5838	18	1A30	9491		ADDM	9,,1	ADVANCE PATCH ADDRESS	DB092780
5839	22	1A31	D001	(1A33)	BUC	\$2		DB092790
5840	6R	1A32	C001		FET	0,1	CHANGE MODE	DB092800
5841	8R	1A33	C100		FET	X0,,0	OLD DATA	DB092810
5842	16	1A34	F00F8E20		SET	DISABLE_MEMORY_PROTECT		DB092820
5843	24	1A36	7221		STA	12,1	NEW DATA	DB092830
5844	26	1A37	8002		SUB	0,2	OLD - NEW FOR CHECKSUM	DB092840
								DB092850
5845	30	1A38	F81900D5		COMM	1,,START_CKSUM		DB092860
5846	34	1A3A	D05F	(1A4A)	BRL	\$6		DB092870
5847	4R	1A3B	F819183C		COMM	1,,ROLL		DB092880
5848	8	1A3D	D02C	(1A4A)	BGE	\$6		DB092890
5849	8R	1A3E	F4080158		ADD	0,,DB_CKSUM		DB092900
5850	10	1A40	5888		COMM	8,,ALPHA		DB092910
5851	14	1A41	D063	(1A45)	BRE	\$8	CHANGE MODE	DB092920
5852	2R	1A42	9001		SUBM	0,,1	ALLOW FOR INCREMENT OF PATCH ADD	DB092930
5853	12	1A43	F0A7014D		STA	10,,DB_PCHAD		DB092940
5854	10R	1A45	F0070158		STA	0,,DB_CKSUM		DB092950
5855	12	1A47	9C01		CLAM	0,,1		DB092960
5856	22	1A48	F0071C05		STA	0,,DB_CKSUM_IGNORE MRKR FOR PRESENT CKSUM PASS		DB092970

PAGE 269
DB092980
DB092990
DB093000
DB093010

ENABLE_MEMORY_PROTECT
1
14.2
DB_HEX\$6

MOD 36 05/18/76 AN/BRN-7
\$6 SET
\$7 BSK
BUC

IA4A F00F8E21
IA4C 0510
IA4D 54E2
IA4E 04001903

8R
22
2R
8

5857
5858
5859
5860

MOD 36 05/18/76 AN/BRN-7

PAGE 270

KEYBOARD CODING AND LAYOUT

121	122	125
	WRITE	WRITE
	1	2
CLEAR		
	17	26
	PATCH	
		INC
	18	
	RETURN	
20		
DISP		
	19	24
	END PCH	DATA

JUMP TABLE FOR ACTION KEYS

DB_JUMP_TABLE:

5861	1A50	1980
5862	1A51	1A00
5863	1A52	1A11
5864	1A53	1A19
5865	1A54	19C1
5866	1A55	19EC
5867	1A56	19F9
5868	1A57	1980
5869	1A58	19C4
5870	1A59	19F1
5871	1A5A	19E9
5872	1A5B	C8F6

DB_UPDATE
DB_PATCH
DB_RETURN
DB_END_PCH
DB_DISPLAY
DB_CLEAR
DB_WRITE1
DB_UPDATE
DB_DATA
DB_WRITE2
DB_INCR

DB093020
DB093030
DB093040
DB093050
DB093060
DB093070
DB093080
DB093090
DB093100
DB093110
DB093120
DB093130
DB093140
DB093150
DB093160
DB093170
DB093180
DB093190
DB093200
DB093210
DB093220
DB093230
DB093240
DB093250
DB093260
DB093270
DB093280
DB093290
DB093300
DB093310
DB093320
DB093330
DB093340
DB093350
093360

PAGE 271
093370
093380
093390
093400
093410
093420
093430
093440

MOD 36 05/18/76 AN/BRN-7

5873
5874
5875
5876
5877
5878
5879

TAPE
TAPE
TAPE
TAPE
SCS
ORG
CGN

4,X(73)
3,12
4,X(71)

1

1ASC
0156
0156 0000

PROG_ID_DB
0

DISPLAY 00 FOR BIT ON C-I

PAGE 273

5911	2R	196E	A000	CLS	0,0	0,0	PREAMP_TEST_ANGLE_LIMIT	093880
5912	4R	196F	F8090580	CGMH	0,0	0,0	PREAMP_TEST_ANGLE_LIMIT	093890
5913	12	1971	8410	FETM	1,0	1,0		TS093900
5914	16	1972	0034 (1977)	BRG	\$12	\$12		TS093910
				TEST PASS	*	*		*H093920
5915	14R	1973	0730	PRN	3	3	FALL THROUGH	093930
5916	86	1974	F8000013	OMEGA	TEST12/2-HOT	TEST12/2-HOT	"SET NEXT OMEGA TASK RF TEST	093940
5917	94	1976	05F0	8BK	15	15		093950
				TEST FAIL	*	*		093960
5918	18R *	1977	2EDC (000C)	FAILD	10,0	10,0	"TEST FAIL-TURN ON MALF LAMP	TS093970
5919	30 *	1978	340F	MARK	0,0	0,0	"	*I093980
5920	34	1979	0807 (1973)	BUC	\$21	\$21	"POST ERROR TYPE IN FAIL WORD	093990
5921	70R	197A	0808	RF_TEST	TEST4/2-HOT	TEST4/2-HOT	"PREAMP - BIT 16	TS094010
5922	78	1978	8659 (0009)	FET	0,0	0,0	"TO OCCUR AFTER A 1 SEC DELAY	TS094020
5923	8R	197C	C010	FET	1,0	1,0	"SELECT TEST+90 DEG SIGNAL	TS094030
					\$11	\$11	"OUTPUT SELECTED SIGNAL TO ALL 3	TS094040
5924	26	197D	F4270020	PTR	2,0	2,0	"ANTENNA SWITCHING MATRICIES	TS094050
5925	16R	197F	8450	FETM	5,0	5,0	"ANTENNA SWITCHING MATRICIES	TS094060
5926	46	1980	F4570011	PTR	5,0	5,0	"CLEAR SIN/COS REGISTERS FOR ALL	TS094070
					\$11	\$11	"3 FREQ TO START DATA COLLECTION	TS094080
5927	54	1982	05F0	8BK	15	15	"RETURN TO \$1 OR \$2 AFTER 1 SEC	TS094090
					*	*		TS094100
5928	70R	1983	080D	OMEGA	TEST6/2-HOT	TEST6/2-HOT	"SET NEXT OMEGA TASK = RF TEST \$2	TS094110
5929	100	1984	F05C0011	FET	5,0	5,0	"TO OCCUR AFTER A 1 SECOND DELAY	TS094120
5930	130	1986	F4571F30	PTR	5,0	5,0	"READ SIN/COS DATA COLLECTED WITH	TS094130
5931	138	1988	865A (00DA)	FET	0,0	0,0	"TEST + 90 SIGNAL	TS094140
5932	142	1989	D80E (197C)	BUC	\$11	\$11	"SELECT TEST SIGNAL	TS094150
					*	*		TS094160
5933	10R	198A	8424	FETM	2,0	2,0	"SET UP 3 COUNTER TO CYCLE THE	TS094170
5934	6R	1988	8400	FETM	0,0	0,0	"3 FREQ IF PREFLIGHT ENTRY	TS094180
5935	16	198C	F12C0012	FET	X2,0	X2,0	"READ SIN/COS FOR THIS FREQ FROM	TS094190
5936	22	198E	8400	FET	X4,0	X4,0	"SIN/COS REGISTERS. THIS DATA	TS094200
5937	32	198F	F14C0011	FET	0,0	0,0	"WAS COLLECTED WITH TEST SIGNAL	TS094210
5938	570	1991	1800	ATAN	0,0	0,0	"FORM ALPHA(T) = ATAN SIN/COS	TS094220
5939	576	1992	8400	FETM	0,0	0,0	"READ SAVED SIN/COS FOR TEST +90	TS094230
5940	586	1993	F14C1F31	FET	X4,0	X4,0	"BEARING_TEMPS+1	TS094240
5941	592	1995	8400	FETM	0,0	0,0	"	TS094250
					*	*		TS094260
					\$2	\$2		TS094270
					*	*		TS094280
					\$4	\$4		TS094290
					*	*		TS094300

5942	602	1996	F16C1F30	MOD 36	05/18/76	AN/BRN-7	X6,,BEARING_TEMPS	"FORM ALPHA(T+90) = ATAN SIN/COS	PAGE 2
5942	602	1996	F16C1F30			FET	0		TS09431
5943	1140	1998	1800			ATAN	0		TS09432
5944	1142	1999	8002			SUB	0,2		TS09433
5945	1146	199A	F8095000			COMM	0,,RF_HI_LIM		TS09434
5946	1150	199C	D02A (19A7)	*		BGE	\$5	"IS ALPHA(T+90) "- ALPHA(T) GREATER THAN" "112.5 DEG?	*209435 TS09436 TS09437
5947	4R	199D	F8093000	*		COMM	0,,RF_LO_LIM	"IS ALPHA(T+90) "- ALPHA(T) LESS THAN" "67.5 DEG?	* 09438 *209439 TS09440 TS09441
5948	8	199F	D047 (19A7)	*		BLE	\$5		*H09442 TS09443 TS09444
5949	14R	19A0	D730	\$6		TEST PASS PRN	3	"ADJUST R15 ROLL	TS09445
5950	16	19A1	9401			ADDM	0,,1	"DOES THE COUNTER "INDICATE THAT THERE ARE MORE "FREQ TO PROCESS?	*209446 TS09447 * 09448
5951	24	19A2	CD18 (1988)	*		BXUD	1,,\$4	"SET PHASE TO DIGITAL TEST AS THE "NEXT OMEGA TASK IN .02 SEC "NEXT TASK = PHASE TO DIGITAL	TS09449 TS09450 TS09451
5952	12R	19A3	D720	*		PRN	2	"TEST FAIL - TURN ON MALF LAMP "	*109452 TS09453 TS09454
5953	84	19A4	F8000012			OMEGA	TEST11/2-HOT	"POST ERROR TYPE IN FAILURE WORD "RF = BITS 2, 4 OR 6 "CONTINUE RF TEST	TS09455 TS09456 TS09457
5954	92	19A6	D5FQ			88K	15		
5955	18R *	19A7	2EDC (00DC)	\$5		TEST FAIL	IO,,HX0080		
5956	44 *	19A8	3551	*		FAILED			
5957	48	19A9	D80A (19A0)			MARK BUC	X5,,1 \$6		

MOD 36 05/18/76 AN/BRN-7

PAGE 275

TS094580

#H094590

#H094600

#H094610

#H094620

#H094630

#H094640

#H094650

#H094660

#H094670

#H094680

TS094690

TS094700

TS094710

TS094720

TS094730

SIGNAL PIN

* THIS ROUTINE WILL MERGE THE
* SINGLE ARGUMENT INTO THE TEST
* SIGNAL SELECT WORD WITHOUT
* DISTURBING THE INTERRUPT INHI-
* BIT OR SYSTEM OR COMPUTER OK
* BITS (12, 10 AND 9)

0,X(74FF)
1,0,OUTPUT_TEST

SIGNAL_PIN FETM
MRG

19AA F40874FF
19AC E0100023

8R
20

5958
5959

1

88K

19AE D510

34

5960

*GET MASK TO SAVE BITS 9, 10, 12
*AND_MISCELLANEOUS_SIGNALS
*AND MERGE ARGUMENT INTO TEST
*SIGNAL SELECT WORD

TS094740

#H094750

#H094760

#H094770

#H094780

#H094790

#H094800

#H094810

#H094820

#H094830

#H094840

TS094850

TS094860

#H094870

TS094880

#H094890

#H094900

#H094910

#H094920

#H094930

#H094940

TS094950

TS094960

TS094970

TS094980

#H094990

#H095000

TS095010

TS095020

TS095030

TS095040

TS095050

TS095060

TS095070

TS095080

TS095090

TS095100

TS095110

#2095120

TS095130

TS095140

#2095150

#2095160

AVIONICS TEST

* THIS TEST IS EXECUTED EVERY .1 SECOND DURING SYSTEM OPERATION.
 * IT EXAMINES THE A/D TEST WORD AND INDICATES A FAILURE WHEN IT
 * IS OUT OF LIMITS AN EXCESSIVE NUMBER OF TIMES. THE TEST IS
 * DIVIDED UP INTO SETS OF 12 SAMPLES. A FAILURE CONSISTS OF 3
 * OR MORE BAD READINGS IN 5 CONSECUTIVE SETS.
 * SPECIAL CONTROL PROGRAM TO ENTER
 * THE AVIONICS TEST EVERY 40 MSEC

* AS AN OMEGA TASK

FETM

PTR

2,,0

2,,AD_DATA

AD_TEST

19AF 8420

1980 F4270028

5961

5962

10R

28

1982 080C

5963

70R

TESTS/2-HOT

OMEGA

FET

PTR

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

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2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

2,,AD_DATA

*ADJUST R15 ROLL

1,1

1983 C011

5964

78

* START AVIONICS TEST - A NON

OMEGA TASK

AVIONICS TEST - PERIODIC VERSION

AD_IC_TEST_ENTRY;

FET

CLAM

3,,AD_DATA

3,,11

1984 F03C0028

1986 9C38

5965

5965

5966

22R

24

1987 F00C001C

5967

34

FET

0,,A_TO_D_CONVERTER_TEST_LOCATION "

*READ AD TEST PARAMETERS

" 1. SET COUNTER (0 TO 11)

" 2. NUMBER FAILURES IN THIS SET

" 3. NUMBER OF CONSECUTIVE SETS

" WITH 3 OR MORE FAILURES

*THE EXPECTED VALUE IS 486 COUNTS

*IN THE 10 MAGNITUDE BITS

*DOES THE TEST

*WORD EXCEED THE EXPECTED VALUE

*BY 24 COUNTS?

*IS THE TEST WORD

*2095160

*2095160

*2095160

*2095160

*2095160

*2095160

*2095160

*2095160

[illegible]

6000	18	19E0	F4000000	MOD 36	05/18/76	AN/BRN-7	PIP	0,, PMU_INPUT	"SET INPUT FOR LAB VELOCITY	PAGE 278
6001	24	19E2	9E50 (00D0)				CLA	0,, PMU_INPUT		095600
6002	28	19E3	F809FFFF				COMM	0,, X(FFFF)		095610
6003	32	19E5	D012 (19E8)				SNE		" PMU CONNECTED	095620
6004	2R	19E6	9C00				CLAM	\$6		095630
6005	10	19E7	7050 (00D0)				STA	0,, 0		095640
6006	16R	19E8	D520				B8K	0,, PMU_INPUT		095650
								2		095660

AD-A050 501

NORTHROP CORP HAWTHORNE CALIF ELECTRONICS DIV
AN/BRN-7 COMPUTER PROGRAM SPECIFICATION. VOLUME
OCT 73

F/6 17/7
XIII. APPENDIX.(U)
N00039-73-C-0209

UNCLASSIFIED

NORT-73-48

NL

4 OF 4
AD A050501



END
DATE
FILMED

4 -78

DDC

TS095670

PHASE TO DIGITAL TEST

TS095680

TS095690

TS095700

TS095710

TS095720

TS095730

TS095740

TS095750

TS095760

TS095770

TS095780

TS095790

TS095800

TS095810

TS095820

TS095830

TS095840

TS095850

TS095860

TS095870

TS095880

TS095890

TS095900

TS095910

TS095920

TS095930

TS095940

TS095950

TS095960

TS095970

TS095980

TS095990

TS096000

TS096010

TS096020

TS096030

TS096040

TS096050

TS096060

TS096070

TS096080

MOD 36

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MOD 36 05/18/76 AN/BRN-7

PAGE 280

TS096090

PHASE COUNTER TEST

#H096100

#H096110

#H096120

#H096130

#H096140

#H096150

TS096160

#H096170

#H096180

#H096190

#H096200

#H096210

#H096220

#H096230

#H096240

#H096250

#H096260

#H096270

#H096280

#H096290

#H096300

#H096310

#H096320

#H096330

#H096340

#H096350

#H096360

#H096370

#H096380

#H096390

#H096400

#H096410

#H096420

#H096430

#H096440

#H096450

TS096460

TS096470

TS096480

TS096490

TS096500

#H096510

MOD 36

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6028

70R

76

86

132

140

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

6029

70R

76

86

132

140

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

6030

70R

76

86

132

140

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

6031

70R

76

86

132

140

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

6032

70R

76

86

132

140

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

118

128

132

136

18R *

30 *

12R

10R

12

16

6044	4R	1A19	F809FFFF1	MOD 36	05/18/76	AM/BRN-7	0, PC_END_LOLIM	PAGE 281
6045	8	1A1B	D022 (1A1E)	*		CORR	\$5	TS096520
6046	18R *	1A1C	2EDC (000C)	*		BGE	10, HX0080	*2096530
6047	30 *	1A1D	3409	\$4		FAILED		*2096540
6048	8R	1A1E	D700	*		MARK PRN		*2096550

"IS THE UP - DOWN
 "TOTAL OUTSIDE THE RANGE OF + 15
 "TO - 15 COUNTS?
 "TEST FAIL - TURN ON MALF LAMP
 "PGST ERROR TYPE IN FAILURE WORD
 "PC 'DOWN' = BIT 10
 "SEQUENCE ON TO DMA TEST

TS096560
 TS096570
 TS096580
 TS096590
 TS096600

MOD 36 05/18/76 AN/5RN-7

PAGE 282
TS096610

DIRECT MEMORY ACCESS TEST

* THIS TEST COMMANDS THE DIRECT MEMORY ACCESS TO GO TO THE TEST MODE AND
* DECREMENT THE DMA TEST LOCATION WORD FOR EACH DMA INPUT (A TOTAL OF 7
* EVERY 5 MILLISEC) AND THEN CHECKS THE RESULTS. IT IS AN OMEGA TASK
* THAT IS EXECUTED AFTER THE PC TEST DURING PREFLIGHT. IT IS THE LAST
* PREFLIGHT TEST AND IT SEQUENCES TO THE SYNCHRONIZATION PROCESS.

* IC DMA TEST

6049	72R	1A1F	F8000011	OMEGA_TEST	OMEGA	TEST10/2-HOT	TS096700
6050	120	1A21	F0031000	SIGNAL			"SET NEXT OMEGA TASK = DMA TEST \$1
6051	126	1A23	8400	FETM			"TO OCCUR AFTER A 5 MILLISEC WAIT
6052	136	1A24	F0070017	STA			"SET DMA TEST BIT (13) IN THE
6053	148	1A26	D500	BBK			"TEST SIGNAL OUTPUT WORD
							"SET THE DMA TEST LOCATION WORD
							"TO ZERO TO START DATA COLLECTION
							"RETURN TO \$1 AFTER 5 MILLISEC

* DMA TEST IS COMPLETE NOW
* RESULTS ARE IN THE DMA
* TEST LOCATION

6054	70R	1A27	0800	OMEGA	SYNCL/2-HOT	TS096800
6055	80	1A28	F00C0017	FET		"SET NEXT OMEGA TASK = SYNC TO
6056	84	1A2A	F809FFFF	COMM		"OCCUR AFTER A 200 MILLISEC DELAY
6057	88	1A2C	D062 (1A2F)	8RE		"SET NEXT OMEGA TASK = SYNC TO
6058	18R *	1A2D	2EDC (00DC)	FAILED		"OCCUR AFTER A 200 MILLISEC DELAY
6059	30 *	1A2E	340A	MARK		"SET NEXT OMEGA TASK = SYNC TO
6060	46R	1A2F	3000	SIGNAL		"OCCUR AFTER A 200 MILLISEC DELAY
6061	58	1A30	D500	BBK		"SET NEXT OMEGA TASK = SYNC TO

"ARE THE DMA TEST
"RESULTS EQUAL TO - 7 COUNTS?
"TEST FAIL - TURN ON MALF LAMP
"POST ERROR TYPE IN FAILURE WORD
"DMA TEST = BIT 11
"TURN OFF ALL TEST SELECT BITS
"IN THE TEST SELECT OUT WORD
"EXIT - NEXT TASK IS SYNC

*H096620
*H096630

*H096640
*H096650

*H096660
*H096670

*H096680
*H096690

TS096700
TS096710

TS096720
TS096730

TS096740
TS096750

TS096760
TS096770

TS096780
TS096790

*H096800
*H096810

*H096820
*H096830

TS096840
TS096850

TS096860
TS096870

TS096880
TS096890

TS096900
TS096910

TS096920
TS096930

TS096940
TS096950

TS096960

#H096970

#H096980

#H096990

#H097000

#H097010

TS097020

TS097030

TS097040

TS097050

TS097060

#2097070

TS097080

TS097090

TS097100

#2097110

TS097120

TS097130

TS097140

#2097150

TS097160

TS097170

TS097180

#2097190

TS097200

TS097210

TS097220

TS097230

#2097240

TS097250

TS097260

TS097270

#1097280

TS097290

#1097300

TS097310

TS097320

TS097330

TS097340

#2097350

TS097360

TS097370

TS097380

1070 A/C TEST

* THIS TEST EXERCISES VARIOUS INSTRUCTIONS IN THE 1070 REPERTOIRE AND
 * CHECKS THE RESULTS. IT IS A SLOW NON OMEGA TASK (ONCE PER SECOND)

GP_TEST_ENTRY:

6062 20R 1A31 F468F0F0 FETM
 6063 58 1A33 F07C0159 FET
 6064 62 1A35 BC06 ADD
 6065 66 1A36 F809FF22 COMM

6066 70 1A38 D01B (1A44) BNE \$1
 6067 2R 1A39 8035 SUB 3,5
 6068 6 1A3A D029 (1A44) BGE \$1
 6069 4R 1A3B F839E5E0 COMM 3,X(1E5E0)
 6070 8 1A3D D046 (1A44) BLE \$1
 6071 2R 1A3E B424 ADD 2,4
 6072 6 1A3F D074 (1A44) BNO \$1
 6073 6R 1A40 A5F0 CLA X15,0
 6074 10 1A41 F809F0F0 COMM 0,X(1F0F0)
 6075 14 1A43 D064 (1A48) BRE \$2
 6076 22R 1A44 D770 PRN 7
 6077 18R * 1A45 2EDC (00DC) \$10
 6078 30 * 1A46 3408 MARK 11
 6079 58 1A47 D580 B8K 8
 6080 22R 1A48 D770 PRN 7
 6081 26 1A49 F869F0F0 COMM 6,X(1F0F0)
 6082 30 1A48 D817 (1A45) BNE \$10
 6083 10R 1A4C FC0A1A5B CLAD 0,\$3

"USE FETM AND FET TO LOAD REGIS-
 "TERS WITH KNOWN VALUES
 "EXERCISE ADD AND COMM
 "ARE THE RESULTS IN ERROR?
 "(BNE)"
 "EXERCISE SUB
 "IS THE SIGN OF
 "THE RESULT IN ERROR?
 "(BGE)"
 "EXERCISE COMM
 "ARE THE RESULTS
 "OF THE SUB OR COMM IN ERROR?
 "(BLE)"
 "EXERCISE ADD TO GET AN OVERFLOW
 "DID THE ATTEMPT
 "TO GET AN OVERFLOW FAIL?
 "(BNO)"
 "EXERCISE CLA(X) FROM R15 STACK
 "DID THE INDEXING
 "AND ROLL WORK CORRECTLY?
 "(BRE)"
 "FAILURE - ADJUST R15 STACK
 "TEST FAIL - TURN ON HALF LAMP
 "POST ERROR TYPE IN FAILURE WORD
 "GP TEST = BIT 12
 "EXIT"
 "ADJUST ROLL WITH PRN
 "DID THE PUSHDOWN
 "STACK ROLL THE REGISTERS WRONG?
 "(BNE)"
 "SIN ARGUMENT

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097550

** OSCILATOR FREQUENCY STABILITY TEST

OSC_TEST_ENTRY:

6097	14R	1A63	F01C0009	FET	1, C, I, OUTPUT, LAMPS, MISCELLANEOUS, SWITCHES	097550
6098	22	1A65	E4001780	EXT	0, 0, MX2010	097560
6099	26	1A67	DC61 (1A69)	BRE	TEST FOR SYNC AND POS UNC	097570
6100	18R	1A68	D530	BBK	\$1 BRANCH IF NO	097580
6101	10R	1A69	FCOA1D53	CLAD	3 GET VAR OF T_O_DOT	097590
6102	20	1A68	F8C81AEC	COMD	0, P44 GET VAR OF T_O_DOT	097600
6103	24	1A60	D02A (1A78)	BGE	0, P44 GET VAR OF T_O_DOT	097610
6104	10R	1A66	FCOA1C21	CLAD	0, XXX+3 GET T_O_DOT	097620
6105	14	1A70	D021 (1A72)	BGE	\$11	097630
6106	4R	1A71	A800	CLS0	0, 0	097640
6107	10R	1A72	F8C81AE2	COMD	0, P44 GET VAR OF T_O_DOT	097650
6108	14	1A74	D053 (1A78)	BRL	0, P44 GET VAR OF T_O_DOT	097660
6109	6R	1A75	E404	FETM	0, P44 GET VAR OF T_O_DOT	097670
6110	14 *	1A76	F8C0262	BSV	0, P44 GET VAR OF T_O_DOT	097680
6111	18R	1A78	D530	BBK	0, P44 GET VAR OF T_O_DOT	097690
					3-8 USEC IS FULL SCALE	097700
					PASS IF LESS	097710
					0, P44	097720
					FAIL_EXTERNAL	097730
					3	

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6112	5000	RF_HI_LIM	EQU	TS097740
6113	3000	RF_LC_LIM	EQU	TS097750
6114		PREAMP_TEST_MAGNITUDE_LIMIT;		TS097760
6114	0000	PREAMP_TEST_ANGLE_LIMIT;	0	TS097770
6115		PREAMP_TEST_ANGLE_LIMIT;		TS097780
6115	0580	ANALOG TO DIGITAL CONVERTER		TS097790
6116	4FF0	AD_HI_LIM	EQU	TS097800
6117	4D10	AD_LC_LIM	EQU	097810
6118	0003	AD_SMALL	EQU	TS097820
6119	0005	AD_BIG	EQU	HM097830
6120	0640	PD_HI_LIM	EQU	HM097840
6121	0200	PD_LC_LIM	EQU	TS097850
6122	Q190	PC_PLUS_LIM	EQU	TS097860
6123	000F	PC_END_HI_LIM;		HM097870
6123		PC_END_LO_LIM;		HM097880
6124	FFF1			TS097890
6124				TS097900
				TS097910
				TS097920
				TS097930
				097940
				097950
				097960

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MT098830
MT098840
MT098850
MT098860
MT098870
MT098880
MT098890
MT098900
MT098910
MT098920
MT098930
MT098940

MT099000	GMT			
MT099010	END_OF_BURST_DATA	10.2	BURST	
MT099020	END_OF_BURST_DATA+2	13.6	BURST	
MT099030	END_OF_BURST_DATA+4	11.3	BURST	
MT099040	PHI_SUB_M			
MT099050	PHI_SUB_M+2			
MT099060	PHI_SUB_M+4			
MT099070	SIGMA_SQUARED_PHI_SUB_M			
MT099080	SIGMA_SQUARED_PHI_SUB_M+2			
MT099090	SIGMA_SQUARED_PHI_SUB_M+4			
MT099100	R11			
MT099110	R12			
MT099120	R13			
MT099130	R21			
MT099140	R22			
MT099150	R23			
MT099160	R31			
MT099170	R32			
MT099180	R33			
MT099190	PSI_A			
MT099200	Q_SUB_T			
MT099210	Q_SUB_T+2			
MT099220	END_OF_BURST_DATA	10.2	SLOT	
MT099230	END_OF_BURST_DATA+2	13.6	SLOT	
MT099240	END_OF_BURST_DATA+4	11.3	SLOT	
MT099250	IME			

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6221	191E 00A2	CON	V2	MT099260			
6222	191F 008E	CON	VC2	MT099270			
6223	1920 9921	CCN	MPX_SP_ADD+X(8000)	MT099280			
				MT099290			
6224	1921 014F	CON	PROGRAM_ID	MT099300			
6225	1922 0151	CON	TAPE_ID	MT099310			
6226	1923 0009	CON	X(0009)	MT099320			
6227	1924 00E5	CON	STATIONS_IN_USE	MT099330			
6228	1925 0000	CON	0	MT099340			
6229	1926 0000	CON	0	MT099350			
6230	1927 0000	CON	0	MT099360			
6231	1928 0000	CON	0	MT099370			
				MT099380			
6232	1929 1F40	CON	X(1F40)	MT099390			
6233	192A 1088	CON	SIGMA_SQ_N_COUNTER	MT099400			
6234	1928 1E78	CON	SIGMA_SQ_N_COUNTER+192	MT099410			
6235	192C 0022	CON	X(0022)	MT099420			
6236	192D 1C03	CON	ROLL_END	099430			
6237	192E 1CE8	CON	XXXX	099440			
6238	192F 1D17	CON	P_MATRIX	MT099450			
6239	1930 0000	CON	0	MT099460			
6240	1931 85D8	ECS		MT099470			

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099480

099490

099500

099510

099520

099530

099540

099550

099560

099570

099580

PT099590

PT099600

PT099610

PT099620

PT099630

PT099640

PT099650

PT099660

PT099670

PT099680

PT099690

PT099700

PT099710

6241

6242

6243

6244

6245

6246

6247

1932

0157

0157

0157

18AE

18AE

18B0

18B1

18B3

18B4

18B5

18B6

18B8

18B9

18B9

18C0

18C0

8R

12

38R

40

44

22R

6R

4R

4R

4R

2R

12R

38

46

56

60

4R

6

10

4R

4R

8

12

2R

6250

6251

6252

6253

6254

6255

6256

6257

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6279

18C1

18C1

18C2

18C3

18C4

18C6

18C7

18C8

18C9

18C8

18CD

18CE

18CF

18D0

18D2

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6280	2R	18D9	8014	(18DC)	COM	1,4	PT099910
6281	6	18DA	D011		BNE	\$14	PT099920
6282	2R	18DB	A430		CLA	3,0	PT099930
6283	2R	18DC	9424	\$14	ADDM	2,4	PT099940
6284	6	18DD	D8DC	(19D2)	BUC	\$7	PT099950
6285	2R	18DE	8014	\$10	COM	1,4	PT099960
6286	6	18DF	D062	(18E2)	BRE	\$11	PT099970
6287	2R	18E0	9423		ADDM	2,3	PT099980
6288	6	18E1	D900	(18D2)	BUC	\$7	PT099990
6289	2R	18E2	9850	\$11	COMM	5,0	PT100000
6290	6	18E3	D011	(18E5)	BNE	\$12	PT100010
6291	2R	18E4	9C54		CLAM	5,4	PT100020
6292	6R	18E5	A522	\$12	CLA	X2,2	PT100030
6293	14	18E6	5659	(00D5)	NIEM	10,,HX0010	PT100040
6294	22	18E7	7122		STA	X2,2	PT100050
6295	30	18E8	5664	(00E4)	NIEM	10,,HX8000	PT100060
6296	32	18E9	DE50		FLG	A+L	PT100070
6297	40	18EA	E400176E		EXT	0,0,HX0007	PT100080
6298	48	18EC	F50A18F5		CLA	X0,,\$16	PT100090
6299	52	18EE	D081	(18F0)	BAT	\$13	PT100100
6300	8R	18EF	525C	(00DC)	MPLM	10,,HX0080	PT100110
6301	2R	18F0	9051	\$13	SUBM	5,1	PT100120
6302	6	18F1	D011	(18F3)	BNE	\$15	PT100130
6303	2R	18F2	9044		SUBM	4,4	PT100140
6304	2R	18F3	A430	\$15	CLA	3,0	PT100150
6305	6	18F4	D809	(188C)	BUC	\$4	PT100160
6306		18F5	387F	\$16	CON	X(387F)	PT100170
6307		18F6	763E		CON	X(763E)	PT100180
6308		18F7	7530		CON	X(7530)	PT100190
6309		18F8	347C		CON	X(347C)	PT100200
6310		18F9	7931		CON	X(7931)	PT100210
6311		18FA	4F46		CON	X(4F46)	PT100220
6312		18FB	0E45		CON	X(0E45)	PT100230
6313		18FC	0D04		CON	X(0D04)	PT100240
							PT100250
							PT100260
							PT100270
							PT100280
							PT100290
							PT100300
							PT100310
							PT100320
							PT100330

		PT_TYPE_SETUP:		O,,STAT ION_COUNTER	
6314	8R	18FD	8635	(0085)	FET
6315	10	18FE	9807		COMM
6316	14	18FF	D061	(1901)	BRE
6317	12R	1900	D500		88K
6318	4R	1901	FC091FC4	\$40	CLAM
6319	28	1903	C240		FET

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MOD	36	05/18/76	AN/BRN-7	CLAM	X5.5	PT100340
6320	32	1904	9055	CLAM	4.0	PT100350
6321	34	1905	8040	CGM	\$1	PT100360
6322	38	1906	D052	BRL	1.0	PT100370
6323	2R	1907	S810	CGMM	\$2	PT100380
6324	6	1908	D051	BRL	5	PT100390
6325	22R	1909	D550	B8K	11.0	PT100400
6326	6R	1904	A610	CLA	13.0	PT100410
6327	20R	1908	C230	FET	10.0	PT100420
6328	28	190C	525C	MPLM	\$4	PT100430
6329	32	190D	D019	BNE	X1.0	PT100440
6330	6R	190E	A510	CLA	X4.2	PT100450
6331	14	190F	7142	STA	3	PT100460
6332	28	1910	D730	PRN	0.3	PT100470
6333	30	1911	9403	ADDM	0.4	PT100480
6334	32	1912	8004	COM	\$3	PT100490
6335	36	1913	D849	BLE	2.2	PT100500
6336	4R	1914	8822	SUBD	13.5	PT100510
6337	20R	1915	7635	PTR	1	PT100520
6338	34	1916	D510	B8K	A+EOB+AT	PT100530
6339	2R	1917	DEEC	FLG	16.1	PT100540
6340	10	1918	AE61	CLAO	6.2	PT100550
6341	4R	1919	8862	CGMO	\$7	PT100560
6342	8	191A	D053	BRL	6.2	PT100570
6343	4R	1918	8862	SUBD	6.2	PT100580
6344	8	191C	8862	SUBD	\$6	PT100590
6345	12	191D	D805	BUC	\$8	PT100600
6346	4R	191E	D083	EAT	A	PT100610
6347	2R	191F	DE00	FLG	6.6	PT100620
6348	6	1920	A866	CLSD	\$6	PT100630
6349	10	1921	D809	BUC	6.2	PT100640
6350	126R	1922	DC62	DIVD	0.0	PT100650
6351	132	1923	4650	MPI	6.0	PT100660
6352	142	1924	F0661932	MPY	X6.26	PT100670
6353	148	1926	F569001A	ADDM	13.4	PT100680
6354	168	1928	7634	PTR	0.4	PT100690
6355	170	1929	9404	ADDM	0.4	PT100700
6356	172	192A	8004	COM	\$3	PT100710
6357	176	1928	DA41	BLE	1.0	PT100720
6358	4R	192C	FC190050	CLAM	3.51	PT100730
6359	8	192E	FC390033	CLAM	2.0	PT100740
6360	10	1930	9C20	CLAM	\$5	PT100750
6361	14	1931	0900	BUC	25	PT100760
6362		1932	0019	CON		


```

DESTINATION_LONGITUDE+32
PT_DEST_LNG+4
DESTINATION_LONGITUDE
PLOT1
X0,,PT_DEST_LNG
PLOT2
X1,,PT_DEST_LNG
PLOT3
X7,,PT_DEST_LAT
PLOT4
X5,,PT_DEST_LNG
PLOT5
X4,,PT_DEST_LAT
PLOT6
X4,,PT_DEST_LAT
PLOT11
4,,X(0003) 0,1
PLOT15
PT_TYPE
PLOT16
PT_TYPE_SETUP
PT_TYPE_SETUP*10+1

```


6406	8R	18A6 8413	HSP_16H	FETM	1,3	QML01460
6407	6R	18A7 F425001C	\$2	LSE	2,4	QML01470
6408	12	18A9 C002		FET	0,2	QML01480
6409	20 *	18AA F80D1893		BSV	HSP	QML01490
6410	28	18AC C406 (18A7)		BXU	0,1\$2	QML01500
6411	16R	18AD 0520	*	8BK	2	QML01510
			*			QML01520
6412	14R *	18AE F0020084	HSP_LINE_D	PLINE	0, X(10084)	QML01530
6413	2R	18B0 S001	\$1	SUBM	0,1	QML01540
6414	6	18B1 0812 (18B0)		8NE	\$1	QML01550
6415	12R	18B2 D500		8BK	0	QML01560
			*			QML01570
			*			QML01580
6416	8R	18B3 F4080081	HSP_D	FETM	0, X(10081)	QML01590
6417	10	18B5 9820		CCMM	2,0	QML01600
6418	14	18B6 0023 (18BA)		BGE	\$1	QML01610
6419	4R	18B7 FC090057		CLAM	0, X(10057)	QML01620
6420	8	18B9 A822		CLSD	2,2	QML01630
6421	8R *	18BA F80D1897	\$1	BSV	HSP_OUT	QML01640
6422	14	18BC 8400		FETM	0,0	QML01650
6423	2R	18BD 8040	\$2	COM	4,0	QML01660
6424	6	18BE 0012 (18C1)		8NE	\$3	QML01670
6425	14R *	18BF F0020040		PLINE	0, X(10040)	QML01680
6426	6R	18C1 C002	\$3	FET	0,2	QML01690
6427	12	18C2 F0040010		RSA	0,11	QML01700
6428	20 *	18C4 F80D1893		BSV	HSP	QML01710
6429	30	18C6 EC221AE4		EXTD	2,2,=DX(07FFFFF)	QML01720
6430	36	18C8 4C2A		MPIDM	2,10	QML01730
6431	44	18C9 C40D (18B0)		BXU	0,1\$2	QML01740
6432	20R	18CA D540		8BK	4	QML01750
			*			QML01760
			*			QML01770
6433		18CB 0038	TYPE_TABLE	CON	X(0038)	QML01780
6434		18CC 007F		CON	X(007F)	QML01790
6435		18CD 0076		CON	X(0076)	QML01800
6436		18CE 003E		CON	X(003E)	QML01810
6437		18CF 0075		CON	X(0075)	QML01820
6438		18D0 0030		CON	X(0030)	QML01830
6439		18D1 0034		CON	X(0034)	QML01840
6440		18D2 007C		CON	X(007C)	QML01850
6441		18D3 0079		CON	X(0079)	QML01860
6442		18D4 0031		CON	X(0031)	QML01870
						QML01880

LINE ADVANCE AND DELAY

OUTPUT N DECIMAL CHARACTERS
SPACE IN CASE DATA IS +

PLUS

INDEX TO GO WITH NO CHAR IN RO
=0 IF NO CHAR TO LEFT OF DEC .DECIMAL POINT
GET NEXT CHAR FROM BITS 12-15 OF
MOST SIG HALF OF DATA = BCD CHARGET RID OF LAST CHAR OUTPUT
GET NEXT CHAR

PAGE 297
 0M101890
 0M101900
 0M101910
 0M101920
 0M101930
 0M101940
 0M101950
 AT101960
 AT101970
 101980

MOD 36 05/18/76 AN/BRN-7

X(004F)
 X(0046)
 X(000E)
 X(0045)
 X(0000)
 X(0004)

CON
 CON
 CON
 CON
 CON
 CON

1805 004F
 1806 0046
 1807 000E
 1808 0045
 1809 0000
 180A 0004

*
 *
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ECS

1808 48CC

6443
 6444
 6445
 6446
 6447
 6448

6449

MCD 36 05/18/76 AN/BRN-7

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** THIS BLOCK FOR PI AND PCI TESTS WHICH REQUIRE INHIBITING THE USE
 * OF PRCP PRED CORRECTION, ANTENNA SWITCHING ALL *, AND PROGRAMR
 * CONTROLLER FAILURE DISPLAY

6450	180C	TAPE	4,X(173)	101990
6451	0157	TAPE	3,12	102000
6452	OE0E	TAPE	4,X(F1)	102010
6453	OE0E	TAPE	1	102020
6454	OE0F	SCS		102030
6455	1764	GRG	PROG_ID_OVL	102040
6456	0157	CCN	X(2000)	102050
6457	OE0E	GRG	DISPLAY DIGIT FOR C_I	102060
6458	OE0E	2SUBD	0,0	102070
6459	OE0F	FILL	CAUSES PP_THETA3=0 IF SIMLTR	102080
6460	1764	GRG	ANTENNA_SELECT_TABLE+2	102090
6461	1765	CCN	X(1)	102100
6462	17CE	CCN	X(4)	102110
6463	17CE	GRG	+A	102120
6464	1700	CCND	+B	102130
6465	1702	CCND	PHI_ZERO_FL OATER AND PHI_ZERO_LOOP	102140
6466	1704	CCND	0	102150
	57F8	ECS	SET TO ZERO * CAUSES DISABLED	102160
			PHASE SHIFT FOR RHO-RHO	102170
			OPERATION	102180
				102190

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6504	2R	1884	981A	COMM	1,10	PAGE 300
6505	6	1885	D141 (18C7)	BLE	\$10	102630
6506	4R	1886	F8190011	COMM	1,17	102640
6507	8	1888	D231 (180A)	BRG	\$99	102650
6508	8R	1889	F51A1808	CLA	X1,, IOTAB1-4	102660
6509	10	1888	981E	COMM	1,14	102670
6510	14	188C	D045 (18C2)	BLE	\$4	102680
6511	10R	188D	F007003C	STA	O, DMAX3	102690
6512	16 *	188F	F110180E	XEQ	X1,, IOTAB3-15	102700
6513	20	18C1	D108 (180A)	BUC	\$99	102710
6514	10R	18C2	F007003B	STA	O, DMAX2	102720
6515	22	18C4	E0000023	MRG	O, O, DMAX23	102730
6516	26	18C6	D103 (180A)	BUC	\$99	102740
6517	8R	18C7	F51A1808	CLA	X1,, IOTAB1-4	102750
6518	18	18C9	F007003C	STA	O, DMAX3	102760
6519	20	18C8	9817	COMM	1,17	102770
6520	24	18CC	D043 (18D0)	BLE	\$57	102780
6521	6R *	18C0	F11018E2	XEQ	X1,, IOTAB2-8	102790
6522	10	18CF	D00A (180A)	BUC	\$99	102800
6523	2R	18D0	B022	SUB	2,2	102810
6524	14	18D1	E0200023	MRG	2, O, DMAX23	102820
6525	18	18D3	D006 (18DA)	BUC	\$99	102830
6526	2R	18D4	B411	ADD	1,1	102840
6527	4	18D5	A421	CLA	2,1	102850
6528	14	18D6	F02A0018	CLAD	X2,, CHO	102860
6529	26	18D8	F8070038	STAD	O, DMAX4	102870
6530	20R	18DA	D760	PRN	6	102880
6531	8R	18D8	D5F0	88K	15	102890
6532		18DC	8000	CGN	X(8000)	102900
6533		18DD	4000	CGN	X(4000)	102910
6534		18DE	2000	CGN	X(2000)	102920
6535		18DF	0400	CGN	X(0400)	102930
6536		18E0	0008	CGN	X(0008)	102940
6537		18E1	0010	CGN	X(0010)	102950
6538		18E2	0020	CGN	X(0020)	102960
6539		18E3	8000	CGN	X(8000)	102970
6540		18E4	4000	CGN	X(4000)	102980
6541		18E5	2000	CGN	X(2000)	102990
6542		18E6	0400	CGN	X(0400)	103000
6543		18E7	0001	CGN	X(0001)	103010
6544		18E8	0002	CGN	X(0002)	103020
6545		18E9	0004	CGN	X(0004)	103030
6546	8R	18EA	0300	SET	0	103040

GO DO LO DISPLAY.

START HI DISPLAY

START LO DISPLAY

SYNCHRO DISPLAY

EXIT UNTILL NEXT INTERRUPT

DC LO 4

THIS BLOCK IS THE PCI NAVIGATION PERFORMANCE 24 HOUR TEST.
IT ALSO IS USED FOR PCI TIMING TEST. NO RZ CALCULATIONS ARE
ALLOWED BECAUSE RZ UPDATES ARE DELETED.

ADDRESS	DATA	OPERATION	COMMENT
6559	18F3	TAPE	4,X(73)
6560	00E5	TAPE	3,12
6561	00E5	TAPE	4,X(F1)
6562	00E6	TAPE	1
6563	C157	SCS	
6564	0157	ORG	STATIONS_IN_USE
6565	0286	CON	X(040E)
6566	0287	CON	X(F8F2)
6567	028C	ORG	PROG_ID_OVL
6568	028D	CON	X(6000)
6569	0290	ORG	ONE_SEC\$101
6570	0296	CON	END_EXEC
6571	0297	CON	END_EXEC
6572	029C	ORG	ONE_SEC\$103
6573	029D	CON	TYPE_NAV_PERF_OUTPUT
6574	02A0	CON	NAV_PERF_DATA
6575	02A0	ORG	MAIN_PROGRAM
6576	02A0	BUC	PCI_INIT
6577	1700	ORG	LAT_N85_N90
6578	170D	BSV	POP12
6579	170F	EXT	GET COUNT
6580	17E1	RSL	PUT CCCCCFF, COUNTS AND
6581	17E3	ADD	2 BLANKS IN REGS 0 AND 1
6582	17E4	CLA	FOLLOWED BY R2-R3 BOTH
6583	17E5	LSA	
6584	17E7	ADD	1,,8
6585	17E9	B8K	1,,X(00FF)
6586	17EA	FETM	EXIT
6587	17EC	CLA	SET NUM CHARS TO TYPE OUT
6588	17ED	ADD	SET CHAR POINTER
6589	17EE	CLA	BY ONE TO INHBT IMMED. T/O
6590	17EF	CLA	
6591	17F1	PTR	6,,TIME_INC2
6592	17F3	FETM	SET NEXT T/O TO OCCUR IN 15M
6593	17F4	PTR	LEAVE REST ZERO
6594	17F6	BSV	8,,0
6595	17F8	BUC	8,,N6_15_COUNT ZERO GOOD RECEPTION COUNTERS
			ALL ZERO.
			MP_CKSUM
			\$1
			ACCUMULATE MEAN (SUMMATION X**2/N) AND (SUMMATION X/N)**2 TERMS
			*FOR COMPUTATION OF STANDARD DEVIATION. ENTER ONCE FOR EACH X

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*WITH R0 = SX SQ 2 WORDS SUM X**2/N
 * R2 = SX 2 WORDS MEAN TERM
 * R4 = N SCALED
 * R5 = N

* R6-R8 SCRATCH
 * R9 NEW VALUE TO BE AVERAGED 2 WORDS

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ADDRESS	INSTR	OPERAND	COMMENT	PAGE
6596	42R	17F9 F0C1FE0	8, SX SQ	103610
6597	52	17F8 FC4A1813	4, N, INC	103620
6598	54	17FD 9850	9, 0	103630
6599	58	17FE D021 (1800)	\$1	103640
6600	4R	17FF A899	CLSD	103650
6601	4R	1800 AC79	9, 9	103660
6602	8	1801 B892	9, 2	103670
6603	134	1802 DC94	9, 9	103680
6604	144	1803 F8940100	9, 2	103690
6605	148	1805 BC29	9, 4	103700
6606	154	1806 FC740040	9, 7	103710
6607	170	1808 6877	9, 7	103720
6608	174	1809 8870	2, 9	103730
6609	300	180A DC74	7, 6	103740
6610	310	180B F8740100	7, 7	103750
6611	314	180D BC07	7, 0	103760
6612	344	180E F4571FE0	5, 9, SX SQ	103770
6613	364	1810 D540	4	103780
6614		1811 00000384	X(00000384)	103800
6615		1813 C1C000C1	X(01000001)	103810
6616				103820
6617	10R	1815 F0C0009	0, C, I, OUTPUT, LAMPS, MISCELLANEOUS, SWITCHES	103830
6618	18	1817 E40000E2	0, 0, HX2000	103840
6619	22	1819 D061 (1818)	\$10	103850
6620	16R	181A D520	2	103860
6621	8R	181B F40A1FEA	0, CHAR_POINTER	103870
6622	20	181D 8430	3, 0	103880
6623	28	181E F0481FE8	4, MAX_COUNT	103890
6624	32	1820 D051 (1822)	\$2	103900
6625	24R	1821 D560	6	103910
6626	8R	1822 F40F8F10	0, PUNCH_OR_PRINTER_BUSY	103920
6627	12	1824 D824 (1821)	\$1	103930
6628	10R	1825 F8452000	4, 2	103940
6629	16	1827 5052	5, 14	103950
6630	18	1828 A435	3, 5	103960
6631	26	1829 F54A1FC6	X4, T_O_BUFFER	103970
	6R	182B F405C010	0, 4	103980
				103990
				104010
				104020
				104030

INCREMENT COUNT N

NEWX-SX

(NEWX-SX)/N RESULT 87 OFF

SCALE SAME AS SX

(NEWX-SX)/N + SX TO SX

NEWX**2

(NEWX**2 - SX SQ)/N + SX SQ

I(900) SEC = 15 MIN

YES, SO EXIT.

EXIT IF NO TYPE OUT

[illegible]

MOD 36 05/18/76 AN/BRN-7 14
88K

18AF D5E0

1156

6699

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104990
105000
105010
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105080
105090
105100
105110
105120
105130
105140
105150
105160

STATION B COUNTS
STATION C COUNTS
STATION D COUNTS
PUT CRS IN LAST WORD
START TIME CALCULATION
GET LAT/LONG FOR SHIP
GET VAR
REPOSITION
PUT BLANK ON RIGHT
FOR STORE.
END OF VAR
START T_3_DOT
PUT BLANK ON RIGH
CLEAR THE FLAG
INNC TO NEXT T/O TIME
BY 15 MIN
X3,,SIGMA_SQ_N_COUNTER+3

2R	9C11	9C12	9C13	9C14	9C15	9C16	9C17	9C18	9C19	9C20	9C21	9C22	9C23	9C24	9C25	9C26	9C27	9C28	9C29	9C30	9C31	9C32	9C33	9C34	9C35	9C36	9C37	9C38	9C39	9C40	9C41	9C42	9C43	9C44	9C45	9C46	9C47	9C48	9C49	9C50	9C51	9C52	9C53	9C54	9C55	9C56	9C57	9C58	9C59	9C60	9C61	9C62	9C63	9C64	9C65	9C66	9C67	9C68	9C69	9C70	9C71	9C72	9C73	9C74	9C75	9C76	9C77	9C78	9C79	9C80	9C81	9C82	9C83	9C84	9C85	9C86	9C87	9C88	9C89	9C90	9C91	9C92	9C93	9C94	9C95	9C96	9C97	9C98	9C99	9C100	9C101	9C102	9C103	9C104	9C105	9C106	9C107	9C108	9C109	9C110	9C111	9C112	9C113	9C114	9C115	9C116	9C117	9C118	9C119	9C120	9C121	9C122	9C123	9C124	9C125	9C126	9C127	9C128	9C129	9C130	9C131	9C132	9C133	9C134	9C135	9C136	9C137	9C138	9C139	9C140	9C141	9C142	9C143	9C144	9C145	9C146	9C147	9C148	9C149	9C150	9C151	9C152	9C153	9C154	9C155	9C156	9C157	9C158	9C159	9C160	9C161	9C162	9C163	9C164	9C165	9C166	9C167	9C168	9C169	9C170	9C171	9C172	9C173	9C174	9C175	9C176	9C177	9C178	9C179	9C180	9C181	9C182	9C183	9C184	9C185	9C186	9C187	9C188	9C189	9C190	9C191	9C192	9C193	9C194	9C195	9C196	9C197	9C198	9C199	9C200	9C201	9C202	9C203	9C204	9C205	9C206	9C207	9C208	9C209	9C210	9C211	9C212	9C213	9C214	9C215	9C216	9C217	9C218	9C219	9C220	9C221	9C222	9C223	9C224	9C225	9C226	9C227	9C228	9C229	9C230	9C231	9C232	9C233	9C234	9C235	9C236	9C237	9C238	9C239	9C240	9C241	9C242	9C243	9C244	9C245	9C246	9C247	9C248	9C249	9C250	9C251	9C252	9C253	9C254	9C255	9C256	9C257	9C258	9C259	9C260	9C261	9C262	9C263	9C264	9C265	9C266	9C267	9C268	9C269	9C270	9C271	9C272	9C273	9C274	9C275	9C276	9C277	9C278	9C279	9C280	9C281	9C282	9C283	9C284	9C285	9C286	9C287	9C288	9C289	9C290	9C291	9C292	9C293	9C294	9C295	9C296	9C297	9C298	9C299	9C300	9C301	9C302	9C303	9C304	9C305	9C306	9C307	9C308	9C309	9C310	9C311	9C312	9C313	9C314	9C315	9C316	9C317	9C318	9C319	9C320	9C321	9C322	9C323	9C324	9C325	9C326	9C327	9C328	9C329	9C330	9C331	9C332	9C333	9C334	9C335	9C336	9C337	9C338	9C339	9C340	9C341	9C342	9C343	9C344	9C345	9C346	9C347	9C348	9C349	9C350	9C351	9C352	9C353	9C354	9C355	9C356	9C357	9C358	9C359	9C360	9C361	9C362	9C363	9C364	9C365	9C366	9C367	9C368	9C369	9C370	9C371	9C372	9C373	9C374	9C375	9C376	9C377	9C378	9C379	9C380	9C381	9C382	9C383	9C384	9C385	9C386	9C387	9C388	9C389	9C390	9C391	9C392	9C393	9C394	9C395	9C396	9C397	9C398	9C399	9C400	9C401	9C402	9C403	9C404	9C405	9C406	9C407	9C408	9C409	9C410	9C411	9C412	9C413	9C414	9C415	9C416	9C417	9C418	9C419	9C420	9C421	9C422	9C423	9C424	9C425	9C426	9C427	9C428	9C429	9C430	9C431	9C432	9C433	9C434	9C435	9C436	9C437	9C438	9C439	9C440	9C441	9C442	9C443	9C444	9C445	9C446	9C447	9C448	9C449	9C450	9C451	9C452	9C453	9C454	9C455	9C456	9C457	9C458	9C459	9C460	9C461	9C462	9C463	9C464	9C465	9C466	9C467	9C468	9C469	9C470	9C471	9C472	9C473	9C474	9C475	9C476	9C477	9C478	9C479	9C480	9C481	9C482	9C483	9C484	9C485	9C486	9C487	9C488	9C489	9C490	9C491	9C492	9C493	9C494	9C495	9C496	9C497	9C498	9C499	9C500	9C501	9C502	9C503	9C504	9C505	9C506	9C507	9C508	9C509	9C510	9C511	9C512	9C513	9C514	9C515	9C516	9C517	9C518	9C519	9C520	9C521	9C522	9C523	9C524	9C525	9C526	9C527	9C528	9C529	9C530	9C531	9C532	9C533	9C534	9C535	9C536	9C537	9C538	9C539	9C540	9C541	9C542	9C543	9C544	9C545	9C546	9C547	9C548	9C549	9C550	9C551	9C552	9C553	9C554	9C555	9C556	9C557	9C558	9C559	9C560	9C561	9C562	9C563	9C564	9C565	9C566	9C567	9C568	9C569	9C570	9C571	9C572	9C573	9C574	9C575	9C576	9C577	9C578	9C579	9C580	9C581	9C582	9C583	9C584	9C585	9C586	9C587	9C588	9C589	9C590	9C591	9C592	9C593	9C594	9C595	9C596	9C597	9C598	9C599	9C600	9C601	9C602	9C603	9C604	9C605	9C606	9C607	9C608	9C609	9C610	9C611	9C612	9C613	9C614	9C615	9C616	9C617	9C618	9C619	9C620	9C621	9C622	9C623	9C624	9C625	9C626	9C627	9C628	9C629	9C630	9C631	9C632	9C633	9C634	9C635	9C636	9C637	9C638	9C639	9C640	9C641	9C642	9C643	9C644	9C645	9C646	9C647	9C648	9C649	9C650	9C651	9C652	9C653	9C654	9C655	9C656	9C657	9C658	9C659	9C660	9C661	9C662	9C663	9C664	9C665	9C666	9C667	9C668	9C669	9C670	9C671	9C672	9C673	9C674	9C675	9C676	9C677	9C678	9C679	9C680	9C681	9C682	9C683	9C684	9C685	9C686	9C687	9C688	9C689	9C690	9C691	9C692	9C693	9C694	9C695	9C696	9C697	9C698	9C699	9C700	9C701	9C702	9C703	9C704	9C705	9C706	9C707	9C708	9C709	9C710	9C711	9C712	9C713	9C714	9C715	9C716	9C717	9C718	9C719	9C720	9C721	9C722	9C723	9C724	9C725	9C726	9C727	9C728	9C729	9C730	9C731	9C732	9C733	9C734	9C735	9C736	9C737	9C738	9C739	9C740	9C741	9C742	9C743	9C744	9C745	9C746	9C747	9C748	9C749	9C750	9C751	9C752	9C753	9C754	9C755	9C756	9C757	9C758	9C759	9C760	9C761	9C762	9C763	9C764	9C765	9C766	9C767	9C768	9C769	9C770	9C771	9C772	9C773	9C774	9C775	9C776	9C777	9C778	9C779	9C780	9C781	9C782	9C783	9C784	9C785	9C786	9C787	9C788	9C789	9C790	9C791	9C792	9C793	9C794	9C795	9C796	9C797	9C798	9C799	9C800	9C801	9C802	9C803	9C804	9C805	9C806	9C807	9C808	9C809	9C810	9C811	9C812	9C813	9C814	9C815	9C816	9C817	9C818	9C819	9C820	9C821	9C822	9C823	9C824	9C825	9C826	9C827	9C828	9C829	9C830	9C831	9C832	9C833	9C834	9C835	9C836	9C837	9C838	9C839	9C840	9C841	9C842	9C843	9C844	9C845	9C846	9C847	9C848	9C849	9C850	9C851	9C852	9C853	9C854	9C855	9C856	9C857	9C858	9C859	9C860	9C861	9C862	9C863	9C864	9C865	9C866	9C867	9C868	9C869	9C870	9C871	9C872	9C873	9C874	9C875	9C876	9C877	9C878	9C879	9C880	9C881	9C882	9C883	9C884	9C885	9C886	9C887	9C888	9C889	9C890	9C891	9C892	9C893	9C894	9C895	9C896	9C897	9C898	9C899	9C900	9C901	9C902	9C903	9C904	9C905	9C906	9C907	9C908	9C909	9C910	9C911	9C912	9C913	9C914	9C915	9C916	9C917	9C918	9C919	9C920	9C921	9C922	9C923	9C924	9C925	9C926	9C927	9C928	9C929	9C930	9C931	9C932	9C933	9C934	9C935	9C936	9C937	9C938	9C939	9C940	9C941	9C942	9C943	9C944	9C945	9C946	9C947	9C948	9C949	9C950	9C951	9C952	9C953	9C954	9C955	9C956	9C957	9C958	9C959	9C960	9C961	9C962	9C963	9C964	9C965	9C966	9C967	9C968	9C969	9C970	9C971	9C972	9C973	9C974	9C975	9C976	9C977	9C978	9C979	9C980	9C981	9C982	9C983	9C984	9C985	9C986	9C987	9C988	9C989	9C990	9C991	9C992	9C993	9C994	9C995	9C996	9C997	9C998	9C999	9C1000
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\$100

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Address	Count	Label	Operation	Comments	Address	Count	Label	Operation	Comments
6741	10	18F6 A410	CLA		105170	1	1.0	TO UPDATE LATER	
6742	18	18F7 F1381FB2	SUB		105180	1	X3,N6_15_COUNT	N TIMES UPDATED IN 15 MIN	
6743	20	18F9 A420	CLA		105190	2	2.0	SAVE IT	
6744	22	18FA A401	CLA		105200	0	0.1	REPLACE FOR NEXT TIME	
6745	32	18FB F1371FB2	STA		105210	1	X3,N6_15_COUNT		
6746	38	18FD F0240080	RSA		105220	2	2.8	RIGHT ADJUST	
6747	40	18FF 9820	COMM		105230	2	2.0	MAKE IT MOD 100	
6748	44	1900 0022 (1903)	BGE		105240	\$20		IF NEGATIVE	
6749	4R	1901 F4290064	ADDM		105250	2	2.X(10064)	ADD 100	
6750	2R	1903 9826	COMM	\$20	105260	2	2.6	NEED 6 IN 15 MIN	
6751	6	1904 D022 (1907)	BGE		105270	53		IF GOOD JUMP	
6752	10R	1905 F0471FEC	STA		105280	4	4.GOOD_BAD_FL	ELSE SET FLAG NON ZERO	
6753	8R	1907 C534 (18F4)	BXU	\$3	105290	3	3.\$100	TEST FOR 9 TIMES	
6754	10R	1908 F0371FEA	STA		105300	3	3.CHAR_POINTER	TEST FLAG	
6755	18	190A F40A1FEC	CLA		105310	0	0.GOOD_BAD_FL	JUMP IF ALL GOOD	
6756	22	190C D065 (1912)	BRE		105320	\$4		ELSE STORE D AND BLANKS	
6757	8R	1900 F40A178C	CLA		105330	0	0.HXDFFF	ELSE STORE D AND BLANKS	
6758	18	190F F0071FCC	STA		105340	0	0.T_O_BUFFER+6	RETURN TO EXEC	
6759	58	1911 D5E0	BBK		105350	14			
6760	24R	1912 D780	PRN	\$4	105360	8			
6761	26	1913 9C18	CLAM		105370	1	1.11	SHIP TO	
6762	28	1914 9C20	CLAM		105380	2	2.0	FOR WAYPT NO. 1	
6763	36 *	1915 F8001483	BSV		105390	1	1.0	MAKE_RANGE_AND_BEARING	
6764	44	1917 8410	FETM		105400	1	1.0	PRESERVE FOR LATER	
6765	48	1918 AC02	CLAD		105410	0	0.2		
6766	56 *	1919 F80017F9	BSV		105420	1	1.0	ACCUMULATE	
6767	632	191B 0C04	GEN		105430	0	0.8	RANGE_DISPLAY RANGE IN R.O.I.	
6768	642	191C F8040080	RSAD		105440	0	0.8	POSITION RESULT	
6769	652	191E F0171FCC	STA		105450	1	1.T_O_BUFFER+6		
6770	686	1920 D5B0	BBK		105460	11			
6771		1921 000151C1	COND		105470	1	1(84665)	ONE DAY + 65 SEC IN SECS	
6772		1FE0	EQU		105480	1	1	DESTINATION_LATITUDE+2	
6773		1FE2	EQU		105490	1	1	DESTINATION_LATITUDE+4	
6774			EQU		105500	1	1	2 WORDS MEAN	
6775			EQU		105510	1	1	DESTINATION_LATITUDE+6	
6776			EQU		105520	1	1	DESTINATION_LATITUDE+7	
6777			EQU		105530	1	1	DESTINATION_LATITUDE+8	
6778			EQU		105540	1	1	DESTINATION_LATITUDE+10	
6779			EQU		105550	1	1	2 WORDS	
6780			EQU		105560	1	1	DESTINATION_LATITUDE+12	
			EQU		105570	1	1	DESTINATION_LATITUDE+13	
			EQU		105580	1	1	DESTINATION_LATITUDE+14	
			EQU		105590	1	1	1 WORD	

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105600
105610
105620

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N6_15_COUNT EQU
T_O_BUFFER EQU
RZ_C
DESTINATION_LONGITUDE+2 9 WORD 16 WORDS

1F82
1FC6
1923 94F5

6781
6782
6783

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** THIS BLOCK IS FOR PCI DYNAMIC RANGE AND RANDOM NOISE TEST
* IT RUNS VIA SIMULATOR, HENCE THAT BLOCK SHOULD ALSO BE LOADED

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6784	1924	ORG	STATIONS_IN_USE	105700
6785	00E5	ORG	X(040EF8F2)	105710
6786	00E5	CON	PLOT15	105720
6787	0146	ORG	TYPE_DYN_RNG_DATA	105730
6788	0146	ORG	PRG_ID_OVL	105740
6789	0157	ORG	X(9000)	105750
6790	0157	CON	ONE_SEC\$103	105760
6791	028C	ORG	END_EXEC	105770
6792	028C	CON	END_EXEC	105780
6793	028D	ORG	PLOT16	105790
6794	0542	ORG	GET_DYN_RNG_DATA	105800
6795	0542	CON	START_OF_BURST\$77-3	105810
6796	0683	ORG	0,0	105820
6797	0683	CON	KALMAN_FILTER+2	105830
6798	0683	ORG	0,0	105840
6799	0683	CON	MAIN_PROGRAM	105850
6800	0683	ORG	DYN_RNG_INIT	105860
6801	0683	CON	ONE_SEC\$101	105870
6802	0683	ORG	END_EXEC	105880
6803	0683	CON	END_EXEC	105890
6804	0683	ORG	MEASUREMENT_UPDATES\$15	105900
6805	0683	CON	SAVE_BP_DATA	105910
6806	0683	ORG	START_OF_BURST\$77	105920
6807	0683	CON	0,6	105930
6808	0683	ORG	1,3	105940
6809	0683	CON	PROPAGATION_PREDICTION	105950
6810	0683	ORG	15	105960
6811	0683	CON	END_OF_BURST\$8	105970
6812	0683	ORG	X(C000)	105980
6813	0683	CON	CD13	105990
6814	0683	ORG	X(0051E000)	106000
6815	0683	CON	X(232E)	106010
6816	0683	ORG	POP8\$1	106020
6817	0683	CON	0,0	106030
6818	0683	ORG	POP8\$5-1	106040
6819	0683	CON	0,0	106050
6820	0683	ORG	THIS GIVES XX.X IN CEC	
6821	0683	CON	3 BLANKS	
6822	0683	ORG		
6823	0683	CON		
6824	0683	ORG		

MOD 36 05/18/76 AN/BRN-7

6866	524	1815	C035	FET	3,5	106490
6867	534	1816	F8241000	RSAD	2,3	106500
6868	544	1818	F8041000	RSAD	0,3	106510
6869	554	181A	F418001A	FETM	1,26	106520
6870	562	181C	C015	FET	1,5	106530
6871	8R	181D	8F28	ADDD	IX2,8	106540
6872	10	181E	9422	ADDD	2,2	106550
6873	18	181F	CC23 (181D)	BXUD	2,34	106560
6874	2R	1820	9082	SUBM	8,2	106570
6875	10	1821	C015	FET	1,5	106580
6876	8R	1822	8F4A	ADDD	IX4,10	106590
6877	10	1823	9442	ADDD	4,2	106600
6878	18	1824	CC43 (1822)	BXUD	4,35	106610
6879	6R	1825	C008	FET	0,11	106620
6880	10	1826	44C2	MPIM	0,2	106630
6881	14	1827	F409101F	ADDD	0,8PDATA4	106640
6882	26	1829	C034	FET	3,4	106650
6883	46	182A	7634	PTR	13,4	106660
6884	54	1828	D700	PRN	0	106670
6885	592	182C	1800	ATAN	0	106680
6886	604	182D	F571CA2	STAD	X9,8PHISTORY	106690
6887	610	182F	C008	FET	0,8	106700
6888	612	1830	9404	ADDD	0,4	106710
6889	618	1831	8400	FETM	0,0	106720
6890	626	1832	F4080016	FETM	0,22	01 106730
6891	12R	1834	CB08	FETD	IX0,11	106740
6892	24	1835	7F24	PTRO	IX2,4	106750
6893	32	1836	CC03 (1834)	BXUD	0,36	01 106760
6894	20R	1837	D760	PRN	6	106770
6895	40	1838	7634	PTR	13,4	106780
6896	50	1839	D710	PRN	1	106790
6897	52	183A	A412	CLA	1,2	106800
6898	62	183B	7A08	STAD	10,8	106810
6899	92	183C	D780	PRN	11	106820
6900	6R	183D	04000472	BUC	MEASUREMENT_UPDATES10	106830
6901	18R	183F	F02C0039	FET	* THIS ROUTINE KEEPS A RUNNING AVERAGE (SX = SUMMATION X/N) AND	106840
6902	32	1841	F01C003F	FET	* ALSO SXSQ = SUMMATION X**2/N FOR THE 3 VALUES OF BP, ONE FOR	106850
6903	42	1843	FC0B1FE2	ADDD	* EACH SXSQ = ROOT(SXSQ-SX**2). RMS= ROOT(SXSQ).	106860
6904	54	1845	F8071FE2	STAD	ACCUMULATEX FET 2,MSXSQ2	106870
6905	64	1847	F00C1FE2	FET	GET ADDRESSES FOR DATA	106880
					1,NN INC2	106890
					0,NN	106900
					0,NN	106910

MOD 36		05/18/76		AN/BRN-7		PAGE 313	
6906	72	1849	841A	FETM	1, 10	106920	
6907	14R	184A	F90C101F	FETO	X0, BPDATA4	106930	
6908	28	184C	F92C102F	FETO	X2, BPDATA4+16	106940	
6909	32	184E	B820	SUBD	2, 0	106950	
6910	42	184F	F824010G	RSAD	2, 7	106960	
6911	168	1851	DC26	DIVD	2, 6	106970	
6912	172	1852	BC02	ADDD	0, 2	106980	
6913	186	1853	FD47102F	PTRD	X4, BPDATA4+16	106990	
6914	196	1855	D710	PRN	1	107000	
6915	204	1856	CC00 (184A)	8XUD	0, \$2	107010	
6916	12R	1857	D720	PRN	2	107020	
6917	20	1858	8414	FETM	1, 4	107030	
6918	12R	1859	CB06	FETO	IX0, 6	107040	
6919	24	185A	CB27	FETO	IX2, 7	107050	
6920	32	185B	CO14	FET	1, 4	107060	
6921	34	185C	BC03	SUB	0, 3	107070	
6922	36	185D	BC42	SUB	4, 2	107080	
6923	46	185E	F8040100	RSAD	0, 7	107090	
6924	56	1860	F8440100	RSAD	4, 7	107100	
6925	182	1862	DC08	DIVD	0, 8	107110	
6926	308	1863	DC48	DIVD	4, 8	107120	
6927	310	1864	B430	ADD	3, 0	107130	
6928	312	1865	B424	ADD	2, 4	107140	
6929	322	1866	D710	PRN	1	107150	
6930	332	1867	7B49	STAD	IX4, 9	107160	
6931	340	1868	AF48	CLAD	IX4, 8	107170	
6932	354	1869	F94C1CA2	FETO	X4, BPHISTORY	107180	
6933	366	1868	5A63 (00E3)	MPLDM	IO, HX4000	107190	01
6934	382	186C	6800	MPYD	0, 0	107200	
6935	386	186D	8802	SUBD	0, 2	107210	
6936	396	186E	F8040100	RSAD	0, 7	107220	
6937	522	1870	DC08	DIVD	0, 8	107230	
6938	526	1871	BC02	ADDD	0, 2	107240	
6939	536	1872	7B6A	STAD	IX6, 10	107250	
6940	554	1873	D750	PRN	5	107260	
6941	562	1874	CD0C (1859)	8XUD	0, \$1	107270	
6942	24R	1875	D560	8BK	6	107280	
6943		OC4D		ORG		107290	
6944				TYPE_DYN_RNG_DATA:	PROPAGATION_PREDICTIONS10	107300	
6945	BR	OC4D	F40F8F10	SNS	PUNCH_OR_PRINTER_BUSY	107310	
6946	12	OC4F	0G27 (0C57)	8GE	\$21	107320	
	18R	OC50	F02C1FE6	FET	2, CHAR_POINT	107330	
						107340	

GET 3 DBL CNT AND INDEX REG.
GET LATEST BP THIS FREQ

RSLD 1
BP**2

- SXSQ

(BP**2-SXSQ)/N + SXSQ
SAVE SXSQ

DO IT 3 TIMES
THEN EXIT

MOD 36 05/18/76 AN/BRN-7

6947	30	OC52	8430	FETM	3,0	107350
6948	38	OC53	F0481FE7	COM	4,,MAX_COUNTER	107360
6949	42	OC55	OC53 (OC59)	BRL	\$20	107370
6950	20R	OC56	D760	PRN	6	107380
6951	6R	OC57	04000285	BUC	EXEC	107390
6952	10R	OC59	F8452000	RSLO	4,,2	107400
6953	16	OC58	5052	RSLO	5,,14	107410
6954	18	OC5C	A435	CLA	3,5	107420
6955	26	OC5D	F54A1FB2	CLA	4,,T_O_BUFFER 2	107430
6956	6R	OC5F	F405001C	LSE	0,,4	107440
6957	14	OC61	C423 (OC5F)	BXU	2,,\$3	107450
6958	8R	OC62	E400177D	EXT	0,0,HX000F	107460
6959	16	OC64	F50A0C72	CLA	X0,,T_O_TABLES	107470
6960	26	OC66	F0071C04	STA	0,,TYPE_OUT	107480
6961	34	OC68	F80F0F01	IOC	0,,LOAD_PRINTER	107490
6962	44	OC6A	FC001C04	PCP	0,,TYPE_OUT	107500
6963	52	OC6C	F41A1FE6	CLA	1,,CHAR_POINT	107510
6964	54	OC6E	9411	ADDM	1,,1	107520
6965	64	OC6F	F0171FE6	STA	1,,CHAR_POINT	107530
6966	68	OC71	D90C (OC56)	BUC	\$19	107540
6967		OC72	0038	CCN	X(0038)	107550
6968		OC73	007F	CCN	X(007F)	107560
6969		OC74	0076	CCN	X(0076)	107570
6970		OC75	003E	CCN	X(003E)	107580
6971		OC76	0075	CCN	X(0075)	107590
6972		OC77	003D	CCN	X(003D)	107600
6973		OC78	0034	CCN	X(0034)	107610
6974		OC79	007C	CCN	X(007C)	107620
6975		OC7A	0079	CCN	X(0079)	107630
6976		OC7B	0031	CCN	X(0031)	107640
6977		OC7C	0057	CCN	X(0057)	107650
6978		OC7D	0015	CCN	X(0015)	107660
6979		OC7E	0026	CCN	X(0026)	107670
6980		OC7F	0045	CCN	X(0045)	107680
6981		OC80	0084	CCN	X(0084)	107690
6982		OC81	0081	CCN	X(0081)	107700
6983		OC82	F01C0085	CCN	SPACE	107710
6983	14R	OC82	F01C0085	FET	1,,STATION_COUNTER	107720
6984	18	OC84	D061 (OC86)	BRE	\$99	107730
6985	14R	OC85	D510	8BK	1	107740
6986	10R	OC86	FC0A1FE0	CLAD	0,,T_O_SEC_COUNT2	107750
6987	18	OC88	96E8 (00E8)	ADDD	0,,=DX(00000001) INCR 1 SEC	107760
6988	30	OC89	F8071FE0	STAD	0,,T_O_SEC_COUNT2	107770

GET_DYN_RNG_DATA:

FET
BRE
8BK
CLAD
ADDD
STAD

RETURN IF NOT BURST 0
01
0,,T_O_SEC_COUNT2
0,,=DX(00000001) INCR 1 SEC

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6989	40	OC88	F808003D	MOD 36	05/18/76	AM/BRN-7	COMD	0,,TEN_MIN	END OF TEST	107780
6990	44	OC8D	OC65 (OC93)				BRE	\$1		107790
6991	10R	OC8E	F8C31FE4				COMD	0,,T_O_TIME2		107800
6992	16	OC90	C406001C				BRE	C_O_R_D		107810
6993	14R	OC92	D510				BBK	1	RETURN TO EXEC	107820
6994	22R	OC93	F03C0039	\$1			FET	3,,MSXSQ2	END OF TEST TYPE OUT	107830
6995	24	OC95	9435				ADDM	3,,5		107840
6996	32	OC96	8414				FETM	1,,4	GET 3 DOUBLE COUNTER	107850
6997	8R	OC97	C010	\$10			FET	1,0		107860
6998	12	OC98	4402				MPIM	0,,2		107870
6999	16	OC99	F409102F				ADDM	0,,8PDATA4+16		107880
7000	36	OC99	C230				FET	13,0		107890
7001	574	OC9C	1800				ATAN	0		107900
7002	578	OC9D	AC20				CLAD	2,0		107910
7003	588	OC9E	D710				PRN	1		107920
7004	598	OC9F	F8C54000				RSLO	0,,1	01	107930
7005	610	OCA1	C824				FETD	IX2,4	GET SX SQ	107940
7006	626	OCA2	6822				MPYD	2,2	SX**2	107950
7007	630	OCA3	8802				SUBD	0,2	SXSQ-SX**2	107960
7008	634	OCA4	D021 (OCA6)				BGE	\$11		107970
7009	4R	OCA5	A802				CLSD	0,0	S. D.	107980
7010	446R	OCA6	1000	\$11			SQRT	0	STORE IN T_O_BUFFER+6	107990
7011	458	OCA7	7F49				PTRD	IX4,9	GET SX	108000
7012	466	OCA8	AF25				CLAD	IX2,5		108010
7013	474	OCA9	C011				FET	1,1		108020
7014	476	OCAA	A421				CLA	2,1		108030
7015	478	OCAB	B011				SUB	1,1		108040
7016	480	OCAC	B033				SUB	3,3		108050
7017	1018	OCAD	1800				ATAN	0		108060
7018	1028	OCAE	F8C54000				RSLO	0,,1		108070
7019	1032	OC80	D031 (OC82)				BRG	\$12		108080
7020	4R	OC81	A800				CLSD	0,0	MAKE IT PLUS	108090
7021	2R	OC82	A487	\$12			CLA	8,7	COMPUTE	108100
7022	4	OC83	9486				ADDM	8,,6	STORE ADDRESS	108110
7023	14	OC84	7B28				STAD	IX2,8	THEN STORE IT	108120
7024	24	OC85	D710				PRN	1		108130
7025	32	OC86	CE00 (OC97)				BXUD	0,,\$10		108140
7026	10R	OC87	F4180018				FETM	1,,24	NO. OF CHARS TO TYPE AND 0.	108150
7027	24	OC89	F4171FE6				PTR	1,,CHAR_POINT	ZERO CHAR POINT	108160
7028	34	OC88	F00C0D3F				FET	0,,N_INC2		108170
7029	44	OC8D	F0171CA1				STA	1,,SAMPLE_MKR	ZERO	108180
7030	62	OC8F	D750				PRN	5		108190
7031	116	OC80	F08C1F88				FET	11,,T_O_BUFFER2+6	START SD COMPUTATION	108200

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7032	136	OCC2	F8060D10	MPYD	0,,THIRD	108210
7033	156	OCC4	F8260D18	MPYD	2,,FIFTY81	108220
7034	176	OCC6	F8460D1A	MPYD	4,,SIXTY81	108230
7035	180	OCC8	BC02	ADDD	0,2	108240
7036	184	OCC9	BC04	ADDD	0,4	108250
7037	194	OCCA	FC2A0D10	CLAD	2,,THIRD	108260
7038	770	OCCC	OC08	GEN	BASE_DISPLAY	108270
7039	774	OCCD	F4190DFF	ADDM	1,,X(00FF)	108280
7040	778	OCCF	FC29FEFF	CLAM	2,,X(1EFF)	108290
7041	796	OCD1	F421F85	PTR	2,,T_Q_BUFFER2+3	108300
7042	806	OCD3	F8480D16	SUBD	4,,FRTYFIV	108310
7043	816	OCD5	F8680D14	SUBD	6,,SIXTY	108320
7044	826	OCD7	F8880D12	SUBD	8,,FIFTY	108330
7045	846	OCD9	F8460D10	MPYD	4,,THIRD	108340
7046	866	OCD8	F8660D18	MPYD	6,,FIFTY81	108350
7047	886	OCD0	F8860D1A	MPYD	8,,SIXTY81	108360
7048	890	OCD6	BC46	ADDD	4,6	108370
7049	894	OCE0	BC48	ADDD	4,8	108380
7050	904	OCE1	FC2A0D10	CLAD	2,,THIRD	108390
7051	934	OCE3	F05C1EB5	FET	5,,PHL_ESTIMATE+18	108400
7052	940	OCE5	FC040800	LSAD	0,,11	108410
7053	946	OCE7	FC240800	LSAD	2,,11	108420
7054	952	OCE9	FC440800	MPYD	4,,11	108430
7055	972	OCEB	F8060D10	MPYD	0,,THIRD	108440
7056	992	OCE0	F8260D18	MPYD	2,,FIFTY81	108450
7057	1012	OCEF	F8460D1A	MPYD	4,,SIXTY81	108460
7058	1016	OCE1	BC02	ADDD	0,2	108470
7059	1020	OCE2	BC04	ADDD	0,4	108480
7060	1030	OCE3	F8045070	MPYDM	0,,X(5D70)	108490
7061	1040	OCE5	F8034000	RSLO	0,,1	108500
7062	1044	OCE7	F8094000	CCMM	0,,X(4000)	108510
7063	1048	OCE9	D041 (OCFB)	BLE	\$14	108520
7064	8R	OCEA	92F3 (00F3)	SUBD	0,,=01(1831-1)	108530
7065	4R	OCEB	88A0	SUBD	10,0	108540
7066	22	OCEC	D750	PRN	5	108550
7067	24	OCE0	9C60	CLAM	6,,0	108560
7068	28	OCE6	AC04	CLAD	0,4	108570
7069	32	OCEFF	D022 (0002)	BGE	\$13	108580
7070	4R	0000	A800	CLSD	0,0	108590
7071	6	0001	9465	ADDM	6,,5	108600
7072	576R	0002	OC08	GEN	BASE_DISPLAY	108610
7073	580	0003	F4190DFF	ADDM	1,,X(00FF)	108620
7074	590	0005	F00C0D0F	FET	0,,CMFO	108630

01

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7075 592 0007 BC08 SUB 0,8 PAGE 317

7076 610 0008 F4271FB2 PTR 2,,T_O_BUFFER 2 108640

7077 636 000A D790 PRN 9 108650

7078 650 000B 0510 B8K 1 108660

7079 000C 00000018 DINC X(00000018) 108670

7080 000E FCDF CON X(FCDF) 108680

7081 000F EEBF CON X(EEBF) 108690

7082 0010 2AAAAA8 THIRD CCND X(2AAAAA8) 01 108700

7083 0012 40C000CC FIFTY CCND X(40000000) 108710

7084 0014 4CCCCCCC SIXTY CCND X(4CCCCCCC) 108720

7085 39999999 FRTYFIV CCND X(39999999) 108730

7086 20000000 FIFTYB1 CCND X(20000000) 01 108740

7087 26666666 SIXTYB1 CCND X(26666666) 01 108750

7088 001C F01C0D38 G_D_R_D FET 1,,MBPDATA 108760

7089 001E 8414 FETM 1,,4 108770

7090 001F C802 FETO 1,,4 3 COUNTER 108780

7091 0020 C011 FET 1,,1 GET 1ST VALUE 108790

7092 0021 A421 CLA 2,,1 108800

7093 0022 B033 SUB 3,,3 108810

7094 0023 1800 ATAN 0 108820

7095 0024 F8C5400C RSLD 0,,1 108830

7096 0026 0C08 GEN BASE_DISPLAY 108840

7097 0027 F41900FF ADDM 1,,X(00FF) 108850

7098 0029 7F36 PTRD IX3,6 108860

7099 002A D7C0 PRN 0 108870

7100 002B CC0D (001F) BXUD 0,,520 108880

7101 002C F0E71CA1 STA 14,,SAMPLE_MKR NON-ZERO 108890

7102 002E F418001C FETM 1,,28 SET POINT 0 AND MAX CNT 28 108900

7103 0030 F4171FE6 PTR 1,,CHAR_POINT 108910

7104 0032 F80C1FE4 FETO 0,,T_O_TIME2 INCR NEXT T_O_TIME 108920

7105 0034 FC080D41 ADDD 0,,T_O_TIME3 108930

7106 0036 FC071FE4 PTRD 0,,T_O_TIME2 108940

7107 0038 D550 B8K 5 108950

7108 0039 1FC6 MSXSQ2 CON * CONSTANTS USED FOR PCI DYN RANGE ONLY 108960

7109 003A 1FCC MSX2 CON SX5Q2 108970

7110 003B 1FD2 MBPDATA CON SX2 108980

7111 003C 1FB3 MT_O_BUFFER CON BPCDATA2 108990

7112 003D 0000005A TEN_MIN CON T_O_BUFFER 2+1 109000

7113 003F 01000000 N_INC2 CON I(90) 109010

7114 0041 00000001 TIME_INC3 CON X(01000000) NN COUNT INCREMENT 187 109020

7115 0043 00000000 FIVE_MIN CON I(11) 109030

7116 0045 0021 CON X(0021) INITIAL CHAR_POINT = 33 109040

109050

109060

MOD	36	05/18/76	AN/BRN-7	CON	X(0020)	INITIAL MAX_COUNT = 32	PAGE 318
7117	0046	0020					109070
7118	0047	0008					109080
7119	1CA1		N_SMOOTHING CON	I(8)	RANGE IS 2 TO 8		109090
7120	1CA2		SAMPLE_MKR EQU	PROP_C	1 S WDS		109100
			BPHISTORY EQU	PROP_C+1	21 D WDS		109110
			* VARIABLE STORAGE FOR PCI DYN RANGE TEST				109120
7121	1FC6		SXSQ2 EQU	DESTINATION_LONGITUDE+2	3 D WDS		109130
7122	1FCC		SX2 EQU	DESTINATION_LONGITUDE+8	3 D WDS		109140
7123	1FD2		BPDATA2 EQU	DESTINATION_LONGITUDE+14	3 D WDS		109150
7124	1F82		T_O_BUFFER2 EQU	RZ_C	15 WORDS		109160
7125			T_O_SEC_COUNT2 EQU				109170
7126	1FE0		NN EQU	DESTINATION_LATITUDE+2	1 D WDS		109180
7127	1FE2		T_O_TIME2 EQU	DESTINATION_LATITUDE+4	1 D WDS		109190
	1FE4		CHAR_POINT EQU	DESTINATION_LATITUDE+6	1 D WDS		109200
7128	1FE6		MAX_COUNTER EQU	DESTINATION_LATITUDE+8	1 S WDS		109210
7129	1FE7		BPDATA4 EQU	DESTINATION_LATITUDE+9	1 S WDS		109220
7130	1D1F			P15			109230
7131	0048	E108	ECS				

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 109240
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 109270
 109280
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 109300
 109310
 109320
 109330
 109340
 109350
 109360
 109370
 109380
 109390
 109400
 109410
 109420
 109430
 109440
 109450

SRN - 17 OPERATIONAL PROGRAM OVERLAY
 MODIFIES ANTENNA SELECTION FOR
 USE WITH WHIP ANTENNA
 MODIFIES SCALING ON LOG INPUT

4,X(73)
 3,12
 4,X(F1)
 1

SYNCS81

Q,,I

VELOCITY_PROCESSINGS81

Q,,F(6076*100/3600811) 100 KNOTS PER 360 DEG

Q,,F(6076*95/3600811)

ANTENNA_SELECT_TABLE

X(00010001)

X(00010001)

X(00010001)

OVERLAY

MOD 36 05/18/76 AN/BRN-7

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*

*

*

*

*

TAPE

TAPE

TAPE

TAPE

SCS

ORG

CLAM

ORG

MPYM

CCMM

ORG

CGND

CGND

CGND

ORG

ECS

0049

02EC

02EC

0683

0683

0685

1762

1762

1764

1766

17D4

17D4

9C01

F0040A8C

F8090A05

00010001

00010001

00010001

00010001

6758

7132

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12

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7154	IAC2	00008852	LITERAL
7154	IAC4	6487ED4F	LITERAL
7154	IAC6	7F24A882	LITERAL
7154	IAC8	006840C5	LITERAL
7154	IACA	00028F20	LITERAL
7154	IACC	00017404	LITERAL
7154	IACE	0517CC1C	LITERAL
7154	IAD0	0001A5E0	LITERAL
7154	IAD2	0092174F	LITERAL
7154	IAD4	FFFEA070	LITERAL
7154	IAD6	27E9F880	LITERAL
7154	IAD8	2CC327EA	LITERAL
7154	IADA	59864FD4	LITERAL
7154	IADC	0000A2FA	LITERAL
7154	IAD E	0010624E	LITERAL
7154	IAE0	001C25C2	LITERAL
7154	IAE2	53E2D624	LITERAL
7154	IAE4	07FFFFF	LITERAL
7154	IAE6	6622	LITERAL

LAST_WORD END

EX109530

NUMBER OF ERRORS = 0

THE COUNT OF UNUSED STORAGE IS 65

ROLL	USED/TOTAL	PERCENT
0	12237/ 40800	= 29.99
4	11232/ 33600	= 33.43
8	512/ 2400	= 21.33
12	0/ 800	= 0.0
16	0/ 8192	= 0.0
20	0/ 48	= 0.0
24	0/ 80	= 0.0
28	180/ 192	= 93.75
32	0/ 0	= 0.0
36	0/ 0	= 0.0
40	0/ 0	= 0.0
44	0/ 0	= 0.0
48	0/ 0	= 0.0
52	0/ 0	= 0.0
56	0/ 0	= 0.0
60	0/ 0	= 0.0
64	0/ 0	= 0.0
68	0/ 0	= 0.0
72	3744/ 3744	= 100.00
76	9324/ 39872	= 23.38
----	37229/129728	= 28.70

ADDR	LITERAL	USE
00E7	07C46929	5
00E9	0AAAAA8	2
00EB	00000001	10
00ED	00000014	2
00EF	1999999A	2
00F1	0008000	3
00F3	7FFFFF	8
00F5	2000000	4
00F7	008C8CC	2
1A7A	C000000	1
1A7C	26666666	1
1A7E	00206666	1
1A80	01FFFFF	1
1A82	0000009B	1
1A84	000007D0	1
1A86	00000004	1
1A88	00000010	1
1A8A	01900000	1
1A8C	033E05EC	1
1A8E	0005D23C	2
1A90	517CC189	1
1A92	00000006	2
1A94	65D8F227	1
1A96	08A87495	1
1A98	506C80D9	2
1A9A	40000000	1
1A9C	001D7D8F	1
1A9E	00008620	1
1AA0	06666666	1
1AA2	000290C9	2
1AA4	006DDE18	3
1AA6	0011A304	1
1AA8	0B115555	1
1AAA	04010D47	1
1AAC	0A000000	1
1AAE	01F40000	1
1AB0	0E49D201	2
1AB2	00084A21	2
1AB4	00000FEA	1
1AB6	08000000	2
1AB8	80000001	1
1ABA	0CCCCCDD	2

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ADDR	LITERAL	USE
1ABC	00000D18	1
1ABE	000084A2	1
1ACO	04000000	1
1AC2	00008892	1
1AC4	6487ED4F	2
1AC6	7F24A882	1
1AC8	00684DC5	1
1ACA	00028F20	2
1ACC	000174D4	1
1ACE	0517CC1C	1
1ADO	0001A5E0	1
1AD2	0092174F	1
1AD4	FFFEA070	2
1AD6	27E9FB80	2
1AD8	2CC327EA	1
1ADA	59864FD4	1
1ADC	0000A2FA	1
1ADE	0010624E	1
1785	00000320	0
1AE0	001C25C2	1
1AE2	53E2D624	1
1AE4	07FFFFF	1

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STMT# / ADDR LABEL STMT# WHERE REFERENCED

497 / 1F5F	BLOCK_NO	109	168	190	200	231	471	473	498
495 / 1F5D	BLOCKS	116	191	202	232	456			
501 / 1F6C	BUFFER	417	454	503					
502 / 005C	BUFFER_LIM	407	421	456	460	503			
498 / 1F61	CHECK_SUM	193	197	238	251	499			
135 / 1041	COMPARE	120							
91 / 2000	CORE_SIZE	92	223						
493 / 1F58	END_CKSUM	96							
496 / 1F5E	END_TAPE	198	483	497					
499 / 1F62	FILL_COMP	118	187	211	235	500			
266 / 1E0F	PPDATA	264							
359 / 1EAO	PPLEADER	145	155	222					
380 / 1E07	PPTABLE	319							
494 / 1F5C	PPTEMP	106	113	114	286	289	290	295	296
321 / 1E66	PRINT	310	334						
304 / 1E4A	PRINT_WORD	277	337	340					
284 / 1E29	PUNCH	154	157	218	220	279	282	355	361
140 / 104A	PUNCH_TAPE	122							
332 / 1E78	PUNCHBCD	150	152						
348 / 1E8F	PUNCHVIS	342	343	345					
396 / 1E07	READ_DATA	167							
503 / 1FC8	ROLL	504							
505 / 1FFA	ROLL_END	93							
504 / 1FE6	ROLL_14	95	505						
158 / 1068	START	129	134						
150 / 1058	START_READ	139							
500 / 1F63	TAPE_DATA	396	428	429	441	501			
426 / 1EFD	TAPE_INPUT	160							
93 / 1000	VERIFY	97	127	130	506				
364 / 1EAT	VISTABLE	351							
492 / 1F5A	XOFFF	115							
488 / 1F56	X000F	318	348						
489 / 1F57	X003F	354							
491 / 1F59	X007F	430							
490 / 1F58	X0070	437							
74 / 0000	A	1856	2207	3881	4821	4843	6256	6339	6347
539 / 001C	A_TO_D_CONVERTER	5967	5986						
4115 / 0004	ACCEPT_GROUP	4076							
548 / 002A	ACCEPT_OLD	3510	3598	3896					
6596 / 17F9	ACCUMULATE	6766							
6901 / 183F	ACCUMULATEX	6852							
6119 / 0005	AD_BIG	5977							
549 / 0028	AD_DATA	5962	5965	5984					

MOD 36 05/18/76 AM/BRN-7
STMT# WHERE REFERENCED

STMT#	ADDR	LABEL	STMT#	WHERE REFERENCED
6116	/ 4FF0	AD_HILLIM	5968	
5666	/ 1949	AD_IO_TEST	1039	
5965	/ 1984	AD_IO_TEST_ENTRY	5883	
6117	/ 4010	AD_LO_LIM	5970	
6118	/ 0003	AD_SMALL	5974	
5961	/ 19AF	AD_TEST	1082	
67	/ 0090	AF	4456	
4458	/ 13EE	ALL STATIONS	5710	5721 5755 5757 5785 5787 5798 5802 5808 5814 5820 5822
43	/ 0008	ALPHA		
5006	/ 16AF	ALPHA_0	3195	3202
83	/ 0008	AND		
5196	/ 178D	ANTENNA_NOISE_AND_CALIBRATE_CODES	1186	
353	/ 0035	ANTENNA_SELECT_SAVE	1199	1225 1608
5163	/ 1762	ANTENNA_SELECT_TABLE	1602	6459 6825 7142
543	/ 0020	ANTENNA_SWITCHING_MATRIX_OUTPUT_10_2	1104	1188 1607 5891 5924
545	/ 0022	ANTENNA_SWITCHING_MATRIX_OUTPUT_11_33		
544	/ 0021	ANTENNA_SWITCHING_MATRIX_OUTPUT_13_6		
5012	/ 1688	ARCSIN	3076	3135
4973	/ 1689	ARCTAN	5019	
4070	/ 120D	ARGINPUT	4112	
4128	/ 000C	ARGUMENT	3855	3924 3966
5395	/ 1F41	ARGWORD1	3878	3903 3971 4072 4274 4298
5396	/ 1F42	ARGWORD2	3862	3873 3916 3930 4027 4032
5241	/ 17D5	ASCII	4040	
2803	/ 08A0	ASSEMBLE_XX	2091	2569 2586
66	/ 0080	AT	4843	6339
4972	/ 1688	ATAN_ENTRY	684	
5033	/ 16CE	ATC	4977	4978 4990
5039	/ 160A	ATC1	4978	
5040	/ 160C	ATC2	4990	
771	/ 0159	AUG_MEM_TEST	6063	
615	/ 0083	AUGMENTER_KEY		
3419	/ 0E90	AUR_DATA	3079	
3395	/ 0E78	AUR_LIMITS	3081	
5266	/ 1C80	AUR_SAVE	3127	
2711	/ 0830	AVERAGE_X	2100	2648
5375	/ 1EE8	AVIONICS	3445	
75	/ 0001	B	2201	2226 2648
629	/ 0008	BASE	3442	3445
4739	/ 0008	BASE_DISPLAY	2201	2226 2981 3003 4253 4255 4477 4481 4655 4658
4747	/ 1564	BCD10BIN	1345	1353 1391 1414 1794 1815 1817 1827 2324 2412 2685 2983
			4371	7038 7072 7096
			3455	3457

MOD 36 05/18/76 AN/ARN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL	STMT#	WHERE REFERENCED
4870 / 1605	BEARING	1594	
4714 / 0000	BEARING_DISPLAY	4545 4571 4578 4584 4631	
5389 / 1F30	BEARING_TEMPS	4609 4621 4622 4626 4632	4633 4641 4642 5901 5909 5930 5940
	5942		
785 / 0166	BEGIN	754 1123	
44 / 0004	BETA	5710 5755 5787 5798 5808 5814 5820	
2910 / 0C26	BETA_LOG	2055	
2909 / 0C24	BETA_NRA		
2911 / 0C28	BETA_PSEUDO		
69 / 0080	BF		
5273 / 1C05	BI		
4229 / 128F	BLANKS_GEN	2039 2041 2118 2325 2538 2541 2591 2593 2771 2772	
7123 / 1FD2	BPDATA2	4190 4236	
7130 / 101F	BPDATA4	6833 6855 7110	
7120 / 1CA2	BPHISTORY	6881 6907 6908 6913 6999	
7080 / 000E	BSD8	6854 6857 6862 6865 6886 6932	
68 / 00A0	BT	2201 3003 4255 4477 4655	
5190 / 1787	BURST_ADDRESSES	1222	
5382 / 1F17	BURST_TIME	1195 1767	
76 / 0002	C	1858 2209 2222 3467 4141	
512 / 0002	C_I_INPUT_KEYBOARD_SWITCHES	3775	
511 / 0001	C_I_INPUT_MISCELLANEOUS_SWITCHES	3760 3767 3768 3771 3773	
513 / 0003	C_I_LEFT_DISPLAY	821 3456 3521 3732 4091 4095 4143	
515 / 0004	C_I_LEFT_DISPLAY_DIGITS_2_TO_1		
514 / 0003	C_I_LEFT_DISPLAY_DIGITS_6_TO_3		
519 / 0007	C_I_LEFT_DISPLAY_LEGEND_AND_PUNCTUATION		
525 / 000D	C_I_LOWER_KEYBOARD_LAMPS	3746 3766 3808 4457 4750	
521 / 0009	C_I_OUTPUT_LAMPS_MISCELLANEOUS_SWITCHES	806 3512 3562 3565 3593 3725 3758 4136 6097 6616 6659	
522 / 0009	C_I_OUTPUT_MALFUNCTION_STATUS_INDICATORS	3484 3558	
516 / 0005	C_I_RIGHT_DISPLAY	3454 3541 4025 4066 4096	
518 / 0006	C_I_RIGHT_DISPLAY_DIGITS_2_TO_1		
517 / 0005	C_I_RIGHT_DISPLAY_DIGITS_6_TO_3		
520 / 0008	C_I_RIGHT_DISPLAY_LEGEND_AND_PUNCTUATION	4455	
595 / 009F	C_I_STATUS_IMAGE	1112 1174 1397 2269 3465	
523 / 0008	C_I_UPPER_LEFT_KEYBOARD_LAMPS	4187 4560	
524 / 000C	C_I_UPPER_RIGHT_KEYBOARD_LAMPS		
667 / 00F8	CAL_R_ADD	1192 1622 1715	
4884 / 1613	CALC_TIME_CORRECTION	1178 3560	
590 / 009A	CALIBRATE_COMPUTED_MARKER	1699 1709 4196	
5378 / 1EF6	CALIBRATE_DATA	1616 1617 1618 1620 5185 5186 5187 5188 5379 5380	
5185 / 1781	CALIBRATE_DATA_ADDRESSES	1625	
5257 / 1C18	CALIBRATE_FAIL_COUNT	1661 1669	
5431 / 1F9A	CALIBRATE_RESULTS	667	

MOD 36 05/18/76 AM/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL	STMT#	WHERE REFERENCED
5394 / 1F40	CALLWORD	3451	3835 3915
5204 / 1795	CAY_ONE	3305	
3399 / 0E7C	CAY_TABLE	3214	
3346 / 0E47	CAYL_TABLE	3224	
4715 / 0715	CDD	4718	4721 4724 4727 4730 4733 4736 4739 4742 4745
4737 / 1559	CO11	4739	
4740 / 155C	CO12	4742	
4743 / 155F	CO13	4745	6816
4716 / 1544	CD2	4718	
4719 / 1547	CD3	4721	
4722 / 154A	CD4	4724	
4725 / 154D	CD5	4727	
4728 / 1550	CD7	4730	
4731 / 1553	CD8	4733	
4734 / 1556	CD9	4736	
71 / 00D0	CF	2222	
5427 / 1F8F	CHANNEL_FAIL	1705	1705 6965 7027 7103
7128 / 1FE6	CHAR_POINT	6946	
6778 / 1FEA	CHAR_POINTER	6620	6638 6640 6754
535 / 0018	CH0	6528	
536 / 0019	CH1		
540 / 001D	CH5		
541 / 001E	CH6		
542 / 001F	CH7		
3394 / 0E77	CI_TABLE	3241	
765 / 0153	CKSUM_LINK	953	
4116 / 0000	CLEAR_PANEL	3813	3832 3912
7081 / 000F	CMFO	7074	
614 / 0087	COLD_START_MKR	2018	2037 3517 3595 3606
2516 / 0A2F	COMPUTE_BI	2540	
2502 / 0A1E	COMPUTE_BI_AND_C	2223	2450
2042 / 079E	COMPUTE_PHI		
2752 / 0862	COMPUTE_THETA1		
5618 / 1922	COND_TABLE	1800	2332 2942 3285 4302 4307
562 / 0070	CONNIE	3148	
624 / 00C3	CONNIE_LIMIT	2554	2575 2672 2674 2675
4712 / 1541	CONVERSION_DATA	2387	2445 2446 2492 2547
760 / 014C	CORR_CKSUM	4659	4715
4933 / 1655	COS	137	140 143 216
5428 / 1F92	COS_THETA_P	3637	4829 4834
528 / 0011	COS_10_2	1972	2211 5429
		1110	1127 1130 1141 1183 1571 1580 1773 5893 5897 5905 5926
532 / 0015	COS_11_33		5929 5937 6011

MOD 36 05/18/76 AN/8RN-7
SYMT# WHERE REFERENCED

STMT#	ADDR	LABEL	STMT#	WHERE REFERENCED
530	0013	COS_13_6	2008	
2010	0769	COVARIANCE_INITIALIZATION	1317	
1322	0407	CP	2209	
70	00C0	CT	2356	2360 4401 4419
77	0003	D	2749	4276 4487 4500 4503
2883	0C05	D_PHI_K1	2175	
2926	0C3D	DATA_TABLE	3530	3538
627	00C8	DAY	793	794 2978 3556 4386 4897 4898
625	00C4	DAY_SINCE_JAN1_1972	3536	4426 4429
5020	16C1	DAYS_BY_MONTH	5714	5720 5723 5725 5731 5733 5736 5740 5806 5809 5811 5837
605	00AA	DB_BUFFER	5849	5854
770	0158	DB_CKSUM	958	961 5856
5255	1C05	DB_CKSUM_IGNORE	5866	
5787	19EC	DB_CLEAR	5869	
5754	19C4	DB_DATA	5679	
5683	1964	DB_DECODE	5865	
5752	19C1	DB_DISPLAY	5815	5864
5820	1A19	DB_END_PCH	5690	5790 5799 5803 5829 5860
5759	19C8	DB_MEX	5871	
5784	19E9	DB_INCR	5698	
5861	1A50	DB_JUMP_TABLE	668	789 5672 5747 5750
566	0078	DB_MODE	5728	5777
668	00FC	DB_M1_ADD	5862	
5802	1A00	DB_PATCH	788	5671 5853
761	014D	DB_PCHAD	5682	5705 5708 5716 5726
5738	19AD	DB_PN8WE	5863	
5814	1A11	DB_RETURN	5804	5817 5823
596	00A0	DB_SAVE	5807	5826
551	0031	DB_SAVEPATCHSTART	5712	5715
5713	152E	DB_SPECIALS	5674	5686 5696 5753 5756 5758 5767 5788 5801 5861 5868
5704	1980	DB_UPDATE	5713	5727 5734 5764 5771 5778
5445	1FF8	DB_WAT	5792	5810 5812 5819 5827 5831
5833	1A28	DB_WRITE	5786	5813 5867
5797	19F9	DB_WRITE1	5870	
5791	19F1	DB_WRITE2	3217	
5173	176F	DCAY_ONE	3302	
3404	0281	DCAY_TABLE	3217	
705	0110	DCAY1_TABLE	3228	
5386	1F28	DELTA_THETA_2	1960	1962 2117 5387
5387	1F2D	DELTA_THETA_3	1959	
616	0089	DELTA_V2	1892	1893 2135 2144 2158 3516
617	008A	DELTA_V3	2140	2145

STMT#	ADDR	LABEL	DESTINATION_LATITUDE	DESTINATION_LONGITUDE	STMT# WHERE REFERENCED	STMT#	WHERE REFERENCED
5437	1F0E	DF_COUNTER	6778	7125	3588	4168	4619
5436	1FC4	DF_MKR	6779	7126	7127	7128	7129
5436	1FC4	DINC	6779	7125	3589	4166	4618
5436	1FC4	DIRECT_MEMORY_ACCESS_TEST_LOCATION	6779	7125	5131	5437	5439
5436	1FC4	DISABLE_MEMORY_PROTECT	6779	7125	5131	5437	5439
5436	1FC4	DISCLEAR	6779	7125	5131	5437	5439
5436	1FC4	DISFINAL	6779	7125	5131	5437	5439
5436	1FC4	DISTART	6779	7125	5131	5437	5439
5436	1FC4	DIURNAL_CONSTANT_TABLE	6779	7125	5131	5437	5439
5436	1FC4	DIVERGENCE CONTROL	6779	7125	5131	5437	5439
5436	1FC4	DMA_INHIBIT	6779	7125	5131	5437	5439
5436	1FC4	DMA_TEST	6779	7125	5131	5437	5439
5436	1FC4	DMA1	6779	7125	5131	5437	5439
5436	1FC4	DMA2	6779	7125	5131	5437	5439
5436	1FC4	DMA23	6779	7125	5131	5437	5439
5436	1FC4	DMA3	6779	7125	5131	5437	5439
5436	1FC4	DMA4	6779	7125	5131	5437	5439
5436	1FC4	DO_NON_OMEGA_TASK	6779	7125	5131	5437	5439
5436	1FC4	DOPPLER_IN_MEMORY	6779	7125	5131	5437	5439
5436	1FC4	DT	6779	7125	5131	5437	5439
5436	1FC4	DYN_RNG_INIT	6779	7125	5131	5437	5439
5436	1FC4	E	6779	7125	5131	5437	5439
5436	1FC4	EAST_OR_WEST	6779	7125	5131	5437	5439
5436	1FC4	ENABLE_CMP_INTERRUPT	6779	7125	5131	5437	5439
5436	1FC4	ENABLE_MEMORY_PROTECT	6779	7125	5131	5437	5439
5436	1FC4	ENABLE_READ	6779	7125	5131	5437	5439
5436	1FC4	ENABLE_RECORDER_INTERRUPT	6779	7125	5131	5437	5439
5436	1FC4	END_BURST	6779	7125	5131	5437	5439
5436	1FC4	END_CKSUM	6779	7125	5131	5437	5439
5436	1FC4	END_CONO_T	6779	7125	5131	5437	5439
5436	1FC4	END_EXEC	6779	7125	5131	5437	5439
5436	1FC4	END_OF_BURST	6779	7125	5131	5437	5439
5436	1FC4	END_OF_BURST_DATA	6779	7125	5131	5437	5439
5436	1FC4	END_OF_SLOT	6779	7125	5131	5437	5439
5436	1FC4	END_SLOT	6779	7125	5131	5437	5439
5436	1FC4	END_TASK	6779	7125	5131	5437	5439
5436	1FC4	END_TEST	6779	7125	5131	5437	5439
5436	1FC4	ENTEREW	6779	7125	5131	5437	5439

STMT#	ADDR	LABEL	STMT#	WHERE REFERENCED	STMT#	WHERE REFERENCED	STMT#	WHERE REFERENCED
5391	/ 1F3D	IMAGE11	3499	3863	3879	3887	3980	3985
5392	/ 1F3E	IMAGE12	3901					4071
5393	/ 1F3F	IMAGE13	3836	3883	3888	3917	4089	5392
594	/ 009E	IMAGE9	595	3726	3757			
20	/ 0010	INERTIAL_SYSTEM_NO_CD	85					
1	/ 8000	INHIBIT_BOTH_CSE_INTERRUPTS						
6	/ AF00	INHIBIT_CMP_INTERRUPT	208	405	484			
56	/ 0001	INHIBIT_READ	111	209	485			
15	/ AB00	INHIBIT_RECORDER_INTERRUPT						
3813	/ 10AA	INPUTERROR	3769	3772	3782	3893	4035	
3910	/ 112F	INSACC	3788	3987				
3995	/ 11A2	INSFIVE	4107					
3993	/ 11A0	INSFOUR	4113					
3997	/ 11A4	INSIX	3962	3990	3992	3994	3996	4108
3991	/ 119E	INSTHREE	4106					
3989	/ 119C	INSTWO	4105					
581	/ 008D	INTEGRATION_COUNTER	2943	3248	3250	3281		
38	/ 8801	INTER_RECORD_GAP	5187					
5438	/ 1FF6	INTERCEPT_LAT	4866					
5439	/ 1FDC	INTERCEPT_LONG	4867					
76	/ 0000	INTERCEPT_INHIBIT	163	780	830	1122	2155	2160
6532	/ 18DC	IOTAB1	6508	6517			6136	6155
6546	/ 18EA	IOTAB2	5521					
6549	/ 18ED	IOTAB3	6512					
6481	/ 1893	IOTEST	6477					
2495	/ 0A15	K_EXIT	2016	2233	2276	2347	2488	
1070	/ 02C8	K_FILTER	1776					
584	/ 0090	KAL_STA_FLG	1176	2014	2498			
5256	/ 1C06	KAL_TEMP	2440	2444	2490	2493	2811	2877
2006	/ 0765	KALMAN_FILTER	1070	1171	6802			
63	/ 0050	L	1856	1858	2360	3681	6296	
1539	/ 0518	L_ALPHA	1454	1486				
5009	/ 1682	LAMBDA_TABLE	2367	2734	4310			
7154	/ 1AE6	LAST_WORD	174	761				
3712	/ 101A	LAT_LONG_SCALING	3583					
5551	/ 19A6	LAT_N00_N05	5636					
5546	/ 189D	LAT_N05_N10	5637					
5541	/ 1893	LAT_N10_N15	5638					
5536	/ 1889	LAT_N15_N20	5639					
5530	/ 187E	LAT_N20_N25	5640					
5524	/ 1873	LAT_N25_N30	5641					
5518	/ 1867	LAT_N30_N35	5642					
5511	/ 185A	LAT_N35_N40	5643					

MOD 36 05/18/76 AN/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL	STMT#	WHERE REFERENCED
5504 / 1840	LAT_N40_N45	5644	
5497 / 1840	LAT_N45_N50	5645	
5490 / 1832	LAT_N50_N55	5646	
5482 / 1822	LAT_N55_N60	5647	
5473 / 1811	LAT_N60_N65	5648	
5464 / 17FF	LAT_N65_N70	5649	
5457 / 17F1	LAT_N70_N75	5650	
5451 / 17E6	LAT_N75_N80	5651	
5448 / 17E0	LAT_N80_N85	5652	
5446 / 17DD	LAT_N85_N90	5653	6577 6829
5555 / 18AE	LAT_S05_S00	5635	6135 6248
5560 / 1897	LAT_S10_S05	5634	
5564 / 18DF	LAT_S15_S10	5633	
5568 / 18C7	LAT_S20_S15	5632	
5572 / 18CF	LAT_S25_S20	5631	
5577 / 18D8	LAT_S30_S25	5630	
5581 / 18DF	LAT_S35_S30	5629	
5585 / 18E6	LAT_S40_S35	5628	
5588 / 18EB	LAT_S45_S40	5627	
5590 / 18EF	LAT_S50_S45	5626	
5592 / 18F3	LAT_S55_S50	5625	
5594 / 18F6	LAT_S60_S55	5624	
5595 / 18F8	LAT_S65_S60	5623	
5596 / 18FA	LAT_S70_S65	5622	
5599 / 18FF	LAT_S75_S70	5621	
5603 / 1907	LAT_S80_S75	5620	
5608 / 1910	LAT_S85_S80	5619	
5613 / 1919	LAT_S90_S85	5618	
4718 / 0001	LATITUDE_DISPLAY	4169	4177
62 / 0040	LE		
5189 / 1785	LEAP_SECOND	4887	
4126 / 000A	LEFT_STATION_PAIR	3865	
5397 / 1F43	LINKWORD	3801	3960 4026 4051 4069 4073 4078
10 / DE00	LOAD_PMU_REGISTER	5739	
11 / DE0A	LOAD_PMU_TIMER		
2 / DF01	LOAD_PRINTER	324	6261 6402 6636 6961
3 / DF02	LOAD_PUNCH	299	
17 / C800	LOAD_RECORDER	6141	
4721 / 0002	LONGITUDE_DISPLAY	4167	4175
4724 / 0003	LOP_DISPLAY	4452	
4119 / 0003	LOWER_KEY	3834	3872 3892 3914
557 / 004A	M_MATRIX	558	2203 2217 2352 2870 2878
2929 / 0C43	M_4_TABLE	2399	

MOD 36 05/18/76 AM/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL	STMT#	WHERE REFERENCED
6195 / 1904	MAG_TABLE	6167	
6136 / 18AE	MAG_TAPE	756	6134 6179
556 / 0040	MAG_TAPE_DATA	1572	6137 6142 6143 6144 6153 6165 6178 6183
951 / 0240	MAIN_PROGRAM	952	6575 6804
5131 / 173E	MAKE_DESTINATION_VECTOR	4608	
4595 / 1447	MAKE_LAT_LONG	3634	4172 4865
4607 / 1483	MAKE_RANGE_AND_BEARING	4237	4242 6763
3705 / 100F	MAKE_TWO_BINARY	3522	3529 3537 3542 3545 3548
5146 / 1751	MAKE_VELOCITY	4244	4580 4804
972 / 025B	MARK_PIN	700	
5082 / 1707	MATRIX_3D	1329	2330
6779 / 1FEB	MAX_COUNT	6622	
7129 / 1FE7	MAX_COUNTER	6948	
7110 / 0D38	M8PDATA	7088	
564 / 0074	MEASUREMENT	2216	2419 2448 2874
565 / 0076	MEASUREMENT_RESIDUAL	2572	2583 2875
1378 / 0448	MEASUREMENT_UPDATE	1533	6809 6900
2770 / 0879	MEASUREMENT_UPDATE_P	2657	
2558 / 0A64	MEASUREMENT_UPDATE_X	2224	2451 2677
563 / 0072	MEASUREMENT_VARIANCE	2220	2395 2421 2429 2447 2449 2491 2515
36 / 0008	MEMORY_AUGMENTER_GO	2688	2689
5277 / 1CFF	MISFIRE_CNT	3466	4140 5125
628 / 00CA	MODE		
5388 / 1F2F	MODE_CHANGE	835	951 6594 6842
953 / 0243	MP_CKSUM	6160	
6232 / 1929	MPX_ADD	6223	
6224 / 1921	MPX_SP_ADD	6901	6994
7108 / 0039	MSXSQ2		
7109 / 003A	MSK2		
7111 / 003C	MT_O_BUFFER		
571 / 0084	N	2017	2021 2083 2559 2633 2659 2663 3462
5366 / 1089	N_CTR_SAVE	2470	2471 2485
6774 / 1FE4	N_GOODS_SCALED		
6615 / 1813	N_INC	6597	6697
7113 / 003F	N_INC2	6902	7028
7118 / 0D47	N_SMOOTHING	6856	
21 / 0020	NAV_INERTIAL_DOPPLER_MODE		
5426 / 1F8E	NAV_MODE	1284	2044 2130 2156
6659 / 1873	NAV_PERF_DATA	6574	
4522 / 1444	NAVIGATION_PERFORMANCE_DATA_COLLECTION		
3899 / 1121	NCT	4511	4512 4515 4518
59 / 0010	NCT_DISPLAY	3841	3850 3885
	NE	2160	2207 6155

MOD 36 05/18/76 AN/BRN-7

SYMT# WHERE REFERENCED

1778 1796 1812 1832

6903 6904 6905

SYMT# / ADDR LABEL

630 / 00C0 NEED_BASE

7126 / 1FE2 NN

65 / 0070 NN

6775 / 1FE5 NO_GOODS

2924 / 0C39 NOISE

591 / 0098 NOISE_COMPUTED_MARKER

5379 / 1F08 NOISE_DATA

585 / 0091 NON_OMEGA_TASK_INDEX

1031 / 02A3 NON_OMEGA_TASK_TABLE

586 / 0093 NON_OMEGA_TASK_TIME

5003 / 16AC NORTH_MAGNETIC_POLE_VECTOR

1709 / 05EF NOT_CALIB

1701 / 05E4 NOT_FOURTH_ITERATION

6781 / 1FB2 N6_15_COUNT

780 / 0161 OFF

631 / 00CE OFF_COUNT

597 / 0095 OLD_NON_OMEGA_TASK_TIME

5664 / 1947 OMEGA_DEBUG

5671 / 1951 OMEGA_DEBUG_ENTRY

589 / 0099 OMEGA_TASK

5118 / 172E OMEGA_TASK_PIN

1058 / 028F OMEGA_TASK_TABLE

588 / 0097 OMEGA_TIME

25 / 0060 OMNI_ANTENNA_AVAILABLE

6771 / 1921 ONE_DAY

1048 / 0285 ONE_SEC

3437 / 0EA2 OPER_P_C

82 / 0004 OR

509 / 0008 OS

5668 / 194D OSC_TEST

6097 / 1A63 OSC_TEST_ENTRY

510 / 01FE OSHEX

546 / 0023 OUTPUT_TEST_AND_MISCELLANEOUS_SIGNALS

3795 / 108F OUTWAL

5240 / 17D4 OVERLAY

5284 / 1D17 P_MATRIX

5290 / 5291 5292 5293 5294

5307 / 5308 5309 5310 5311

5324 / 5325 5326 5327 5328

5341 / 5342 5343 5344 5345

5358 / 5359 5360 5361 5362

2849 / 0806 P_SYM

2071 2801

MOD 36 05/18/76 AN/BRN-7

SYMT# WHERE REFERENCED

1778 1796 1812 1832

6903 6904 6905

SYMT# / ADDR LABEL

630 / 00C0 NEED_BASE

7126 / 1FE2 NN

65 / 0070 NN

6775 / 1FE5 NO_GOODS

2924 / 0C39 NOISE

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5671 / 1951 OMEGA_DEBUG_ENTRY

589 / 0099 OMEGA_TASK

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509 / 0008 OS

5668 / 194D OSC_TEST

6097 / 1A63 OSC_TEST_ENTRY

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3795 / 108F OUTWAL

5240 / 17D4 OVERLAY

5284 / 1D17 P_MATRIX

5290 / 5291 5292 5293 5294

5307 / 5308 5309 5310 5311

5324 / 5325 5326 5327 5328

5341 / 5342 5343 5344 5345

5358 / 5359 5360 5361 5362

2849 / 0806 P_SYM

2071 2801

MOD 36 05/18/76 AN/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL	STMT#	WHERE REFERENCED
5421 / 1F7B	PANEL_SOUND	4647	
5406 / 1F53	PANEL_BUFFER	4649	
555 / 003E	PANEL_COUNT	2013	4130 4133
5409 / 1F67	PANEL_DATA	800	4647 4648
3763 / 1060	PANEL_INPUT	758	
3447 / 0E82	PANEL_MAIN	1037	3605 3703 3704 4135 4620
4074 / 1214	PANEL_PIN	687	
4101 / 1238	PANEL_PIN_TABLE	4114	
3722 / 1027	PANEL_TEST	3449	
5400 / 1F47	PANELMODE	807	3448 3460 3762 3764 3809
4130 / 1248	PANELOUTPUT	3453	4562
5399 / 1F45	PANELTIME	3735	3737
3802 / 109C	PANOUT	3765	3812 3816 3822 3825 3831 4101 4102 4103
3815 / 10AD	PANTEST	3790	
593 / 009D	PAST_NAV_MODE	1280	1285 1287
6123 / 000F	PC_END_HI_LIM	6042	
6124 / 00F1	PC_END_LO_LIM	6044	
602 / 00A6	PC_INSERT	2206	2232 3654
6122 / 0190	PC_PLUS_LIM	6036	
6028 / 1A04	PC_TEST	1088	1090
6586 / 17EA	PCI_INIT	6576	
6120 / 0640	PD_HI_LIM	6016	6020
6121 / 0200	PD_LO_LIM	6018	6022
6007 / 19E9	PD_TEST	1086	1094
632 / 00CF	PFG_COUNT	1119	1121
24 / 0050	PFG_COUNTDOWN_NO_GOOD	1117	1567
527 / 0010	PHASE_COUNTER_TEST_LOCATION	6030	6035 6041
2915 / 0C30	PHI_CODE	2816	
5371 / 1E63	PHI_DOT_DR	5079	
5381 / 1E0E	PHI_DOT_DR_BASE	1347	1349 1359 2401
5372 / 1E73	PHI_DOT_ESTIMATE	5080	
5373 / 1E43	PHI_ESTIMATE	2296	2906 3339 4263 4361 4489 4493 4494 5081 7051
5384 / 1F1F	PHI_M_BASE	1405	1417 6844
559 / 005C	PHI_MATRIX	560	561 562 563 564 565 2042 2046 2137 2141 2812
5390 / 1F3C	PHI_OFFSET	4446	4473 4497
2807 / 08A6	PHI_P_PHIT	2067	2070 2094
5376 / 1EED	PHI_SUB_M	1448	5193 6199 6200 6201
5377 / 1EF3	PHI_ZERO	946	1695 5191
5234 / 17CE	PHI_ZERO_FLOATER	1692	6462
5237 / 1701	PHI_ZERO_LOOP	1694	
5231 / 17C8	PHI_ZERO_0	1688	
80 / 0002	PIN_MODE		
5131 / 173E	PLOT1	6366	

MOD 36 05/18/76 AM/9RN-7
STMT# WHERE REFERENCED

STMT# / ADDR LABEL
3967 / 113F PLOT11
757 / 0146 PLOT15
1573 / 0542 PLOT16
3307 / 0E0E PLOT17
4179 / 1273 PLOT2
759 / 014A PLOT20
3703 / 0F81 PLOT3
3704 / 0F83 PLOT4
4180 / 1276 PLOT5
5133 / 1741 PLOT6
30 / 8E30 PMU_DISPLAY_BUSY
597 / 00A1 PMU_INDICATOR_WORD
42 / 8E10 PMU_INDICATORS
633 / 0000 PMU_INPUT
28 / 8E10 PMU_KEYBOARD_REQUEST
29 / 8E20 PMU_TIMER_OVERFLOW
6578 / 1700 POP_12_SUB
4163 / 1270 POP1
4542 / 145F POP10
4551 / 146A POP11
4906 / 1420 POP12
4563 / 147C POP13
4574 / 1488 POP14
4583 / 1498 POP15
4191 / 1293 POP2
4232 / 12C2 POP4
4445 / 1309 POP5
4237 / 12C9 POP6
4240 / 12CE POP7
4255 / 12E2 POP8
4384 / 1386 POP9
5177 / 1776 POS_NOISE_TABLE
2209 / 0892 POSITION_MEASUREMENT
569 / 0081 POSITION_NOISE
638 / 0005 POWERS_OF_TWO
611 / 0084 PP_STATION
5283 / 1D0F PP_THETA2
5270 / 1C89 PP_THETA3
4114 / 123A PPT

3974 6378
6380 6791
6133 6382 6798
6457
6368
6476
6370
6372
6374
6376
5704
966
5742
1883
5676 5677 5681 6000 6001 6005
5673

6701 6704 6707
4161 4179 4180 6717
4158
4150
4153 6578
4543
4157
4159 4573
4151
4152 6724
4156
4160
4154
4162 4254 6821 6823
4155 4540 6711
3518 3592
2227 2229
2218 3655
858 972 1791 2259 4558 4922
2495 2499
2740 3319 4313 4315
2742 3308 4264 4265
4080 4115 4117 4118 4119 4120 4121 4122 4123 4124 4125 4126

1076 1078
5912

4127 4128 4129
PREAMP_TEST
PREAMP_TEST_ANGLE_LIMIT
PREAMP_TEST_MAGNITUDE_LIMIT

MOD 36 05/18/76 AN/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL	STMT#	WHERE REFERENCED
5886 / 194F	PREFLIGHT_TEST	1074	
4457 / 13EC	PROCESS_LEFT_PAIR	4449	
4455 / 13E9	PROCESS_RIGHT_PAIR	4447	
5398 / 1744	PROCWORD	3780 3783 4079	
768 / 0156	PROG_ID_DB	808 5661 5878	
769 / 0157	PROG_ID_OVL	6131 6246 6391	6455 6472 6567 6793
763 / 014F	PROGRAM_ID	809 834 6224	
35 / 000C	PROGRAM_SEQUENCING	832 1013 1177	
18 / 8CC3	PROGRAMMER_CONTROLLER_GO_LIGHT	833	
5269 / 1CA1	PROP_C	2390 2392 3313 7119 7120	
5265 / 1C63	PROP_PRED_RESULTS	2932 3318	
2932 / 0C49	PROPAGATION_PREDICTION	2500 3341 6814 6943	
623 / 00C2	PSI_A	1596 1899 2131 6214	
582 / 008F	PSI_A_SAVE	583 2132 2133	
5405 / 1F52	PSI_A_STAR		
5423 / 1F88	PSI_INSERT	1878 3581 4544	
6364 / 1FE8	PT_DEST_LAT	6371 6375 6377	
6363 / 1FE4	PT_DEST_LNG	6364 6367 6369 6373	
6365 / 1FC4	PT_IMAGE	6251 6260 6262 6273 6318	
6249 / 18AE	PT_TYPE	6381	
6314 / 18FD	PT_TYPE_SETUP	6383 6384	
4101 / 123B	PT1	4117	
4110 / 1244	PT10	4126	
4111 / 1245	PT11	4127	
4112 / 1246	PT12	4128	
4113 / 1247	PT13	4129	
4102 / 123C	PT2	4118	
4103 / 1230	PT3	4119	
4104 / 123E	PT4	4120	
4105 / 123F	PT5	4121	
4106 / 1240	PT6	4122	
4107 / 1241	PT7	4123	
4108 / 1242	PT8	4124	
4109 / 1243	PT9	4125	
26 / 8F10	PUNCH_OR_PRINTER_BUSY	297 322 6249 6399 6625 6944	
5285 / 1017	P11	2035 2170 2243 2693 2695	
5286 / 1019	P12		
5287 / 1018	P13		
5288 / 101D	P14		
5289 / 101F	P15		
5290 / 1021	P16		
5291 / 1023	P17		
5292 / 1025	P18		

7130

MOD 36 05/18/76 AM/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL
5293 / 1027	P19
5294 / 1029	P21
5295 / 1028	P22
5296 / 1020	P23
5297 / 102F	P24
5298 / 1031	P25
5299 / 1033	P26
5300 / 1035	P27
5301 / 1037	P28
5302 / 1039	P29
5303 / 1038	P31
5304 / 1030	P32
5305 / 103F	P33
5306 / 1041	P34
5307 / 1043	P35
5308 / 1045	P36
5309 / 1047	P37
5310 / 1049	P38
5311 / 1048	P39
5312 / 1040	P41
5313 / 104F	P42
5314 / 1051	P43
5315 / 1053	P44
5281 / 1006	P44 INC_RATE
5316 / 1055	P45
5317 / 1057	P46
5318 / 1059	P47
5319 / 1058	P48
5320 / 1050	P49
5321 / 105F	P51
5322 / 1061	P52
5323 / 1063	P53
5324 / 1065	P54
5325 / 1067	P55
5326 / 1069	P56
5327 / 1068	P57
5328 / 1060	P58
5329 / 106F	P59
5330 / 1071	P61
5331 / 1073	P62
5332 / 1075	P63
5333 / 1077	P64
5334 / 1079	P65

2036 2246 2696 2698

2031 2239 2700 3471

2029 2168 2169 2640 6101
2163 2165

MOD 36 05/18/76 AN/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR LABEL

5335 / 1078	P66
5336 / 1070	P67
5337 / 107F	P68
5338 / 1081	P69
5339 / 1083	P71
5340 / 1085	P72
5341 / 1087	P73
5342 / 1089	P74
5343 / 1088	P75
5344 / 108D	P76
5345 / 108F	P77
5346 / 1091	P78
5347 / 1093	P79
5348 / 1095	P81
5349 / 1097	P82
5350 / 1099	P83
5351 / 1098	P84
5352 / 109D	P85
5353 / 109F	P86
5354 / 10A1	P87
5355 / 10A3	P88
5356 / 10A5	P89
5357 / 10A7	P91
5358 / 10A9	P92
5359 / 10AB	P93
5360 / 10AD	P94
5361 / 10AF	P95
5362 / 10B1	P96
5363 / 10B3	P97
5364 / 10B5	P98
5365 / 10B7	P99
554 / 0038	Q_M
5374 / 1ED3	Q_STORAGE
552 / 0032	Q_SUB_T
558 / 004A	R_MATRIX
4727 / 0004	RANGE_DISPLAY
5106 / 171F	RAT_TABLE
5385 / 1F25	RAM_H
12 / CE08	READ_PMU_KEYBOARD
8 / CF02	READ_START_ADDRESS
9 / CF03	READ_STOP_ADDRESS
4 / CF01	READ_TAPE
1702 / 05E5	REC_ERROR

1238	901	908	921	933	1246	4195	4203
900	1759	5190	6215	6216			
1746	2062	2064	2074				
2043	6689	6767					
4238	3230	1390	1534	1536			
3226	1247	1248					
5675	5999						
112							
427							
1641							
1665							

MOD 36 05/18/76 AN/BRN-7
STMT# WHERE REFERENCED

STMT#	ADDR	LABEL	STMT#	WHERE REFERENCED
2877	/ 08FB	REG_SETUP	2502	2770
5095	/ 1714	REGISTER_CROSS	2759	2946 4634 4776
5112	/ 1728	REGISTER_DOT	2761	2766 4623 4627 4643 4790 4794
5	/ 9F00	RESET_CMP_INTERRUPT	426	
34	/ 000A	RESET_PFG_COUNTDOWN	827	5887
13	/ 9E00	RESET_PMG_INTERRUPT		
14	/ 9800	RESET_RECORDER_INTERRUPT	6139	6186
568	/ 0080	RESET_TF	1268	1281 1830 3610
1902	/ 06E3	RESOLVE	1882	2151
5280	/ 1004	RES2	2138	2139
5279	/ 1002	RES3	2142	2143
52	/ 0000	REVERSE	210	486
6112	/ 5000	RF_HILLIM	5945	
6113	/ 3000	RF_LOLLIM	5947	
5921	/ 197A	RF_TEST	1080	1084 1096 6009
4127	/ 0008	RIGHT_STATION_PAIR	3866	
5411	/ 1F69	RIJ	669	762 2038 2040 3607 4788 4792 5078 5412 5413 5414 5415
669	/ 00FD	RIJ_ADD	1798	1964 2940 3283 3633
5408	/ 1F55	RIJ_STAR	4171	4301 4306 4613 4614
1927	/ 0701	RIJ_UPDATE	1034	
5249	/ 183C	ROLL	181	397 799 5847
5252	/ 1C03	ROLL_END	786	6236
5251	/ 18E8	ROLL_14	785	
5250	/ 183C	ROLL_15	766	
766	/ 0154	ROLLADDRESS		
1974	/ 0743	ROTATE_RIJS	1966	2120
4746	/ 1562	ROUND_FOR_H	4673	
49	/ 0002	RUN	164	204 210 412 486
5442	/ 1FDA	RZ_ALPHA	3667	3679 5443
5435	/ 1F8E	RZ_BETA	3701	4563 4775
5433	/ 1F82	RZ_C	4778	4789 4854 6781 7124
5434	/ 1F88	RZ_POS	3665	3681 4564 4565 4767 4782 4786 4793 4858
5441	/ 1FF2	RZ_RATE	4772	4810 5444
5440	/ 1FD8	RZ_TIME	4847	5442
4788	/ 159B	RZ_TIME_UPDATE	1050	
4765	/ 1579	RZ_UPDATE	1049	
5443	/ 1FDB	RZ_VEL	3677	4572 4766 6205
5412	/ 1F69	R11	1932	2945 4805
5413	/ 1F68	R12	227	6206
5414	/ 1F60	R13	6207	
5415	/ 1F6F	R21	228	1593 1936 1967 6208
5416	/ 1F71	R22	6209	

MOD 36 05/18/76 AN/BN-7
STMT# WHERE REFERENCED

STMT# / ADDR	LABEL	STMT#	WHERE REFERENCED
5417 / 1F73	R23	6210	
5418 / 1F75	R31	1939	1968 6211
5419 / 1F77	R32	6212	
5420 / 1F79	R33	229	3608 6213
7119 / 1CA1	SAMPLE_MKR	6850	7029 7101
6844 / 1F75	SAVE_BP_DATA	6810	
5430 / 1F96	SAVE_POSITION_VARIANCES	2032	2081 3468 3520 3604 4232 4233
2038 / 0796	SAVE_RIJ	2019	
4928 / 164F	SC_ENTRY	682	
5267 / 1C9F	SEASON_INDEX_NORTH	3001	3131
5268 / 1CA0	SEASON_INDEX_SOUTH	3005	3133
2201 / 0888	SELECT_MEASUREMENT		
51 / 0008	SELFTTEST_ON		
538 / 0018	SHIP_SPEED_INPUT		
4736 / 0007	SIG_DISPLAY	4235	
2913 / 0C2C	SIGMA_LOG		
2912 / 0C2A	SIGMA_NRA	2058	
2914 / 0C2E	SIGMA_PSUDO		
5278 / 1000	SIGMA_SQ_KICK	2034	2692
5367 / 1088	SIGMA_SQ_N_COUNTER	1277	2257
5368 / 1003	SIGMA_SQ_PHI_DOT_PHI_DOT	2307	2462 5072
5370 / 1E33	SIGMA_SQ_PHI_PHI	1273	2299 2460 4526 5074
5369 / 1E03	SIGMA_SQ_PHI_DOT	1493	2458 5073
547 / 0024	SIGMA_SQUARED_PHI_SUB_M	5192	6202 6203 6204
5958 / 19AA	SIGNAL_PIN	698	
4934 / 1656	SIN	2334	3016 3020 3030 4930
4929 / 1650	SIN_COS		
5429 / 1F94	SIN_THETA_P	5935	
529 / 0012	SIN_10_2		
533 / 0016	SIN_11_33		
531 / 0014	SIN_13_6		
4124 / 0008	SIX_DIGITS		
7084 / 0D14	SIXTY		
7087 / 0D1A	SIXTY81		
1043 / 02AF	SLOW		
600 / 00A4	SLOW_RATE		
1913 / 06EE	SMOOTH		
5410 / 1F67	SMOOTH_DATA		
5407 / 1F53	SMOOTH_DATA_STAR		
4730 / 0005	SPEED_DISPLAY		
23 / 0040	SPEED_EXITATION_B		
4900 / 1629	SQUARE_ROOT		
5383 / 1F19	SS_PHI_M_BASE		

MOD 36 05/18/76 AN/BRN-7
STMT# WHERE REFERENCED

STMT#	ADDR	LABEL	STMT#	WHERE REFERENCED
4036	1100	STAPAIR	4110	4111
4104	123E	START_ACCEPT_GROUP	4115	
1068	02C9	START_BURST	1579	
636	0005	START_CKSUM	165	5845
609	0082	START_CNT	1423	1777 1788
610	0083	START_MKR	1426	1785 1831
1763	0635	START_OF_BURST	1068	6800 6811
1565	0538	START_OF_SLOT	1064	
1156	0334	START_OMEGA	1042	
592	009C	START_OMEGA_NOW	950	1156 1175
1064	02C5	START_SLOT	1181	
580	0088	START_SYNC_TIME	942	943 1107 1158 4886
5155	175A	STATION_BURST_TIMES	1766	2897
612	0085	STATION_COUNTER	1185	1240 1378 1582 1611 1614 1728 1763 1771 2007 4270 6184
			6314	6983
603	00A7	STATION_INDEX		
613	0086	STATION_NUMBER	2235	2273 2278 2407 2684
5207	1798	STATION_VECTOR_TABLE	670	2753 5077
654	00E5	STATIONS_IN_USE	859	1792 1854 2258 3507 4551 6227 6564 6789
4253	12E0	STATUS_CCOH	4194	
4181	1284	STATUS_FAIL	4192	
3881	1105	STATUS_INPUTS	3875	3877
53	0000	STOP	102	125 136 141 462 477
526	000E	SUM_T_ZERO_DOT	2194	2195
5139	1748	SUN_CONS	3006	
670	00FE	SV_ADD	1592	2328 2939
4589	14A1	SWAP	4239	4252 4550 4582 4588
6773	1FE2	SX	6683	
6772	1FE0	SXSQ	6591	6596 6612 6663 6681
7121	1FC6	SXSQ2	6831	7108
7122	1FCC	SX2	7109	
1098	02E7	SYNC	1012	1058 1060 1062 1569 7137
5262	1E7A	SYNC_BASE	1114	1124 1142 5263
5260	1DAE	SYNC_C	845	5261
838	0184	SYNC_CALC		
5261	1E78	SYNC_COUNT	5262	
5259	1C1E	SYNC_DATA	946	947 1113 1134 5260
577	0087	SYNC_DATA_ADDRESS	986	
576	0087	SYNC_DATA_ADDRESS	1133	
5263	1E7D	SYNC_DATA_COUNTER	1154	
578	0088	SYNC_FREQUENCY	854	
5041	16DE	SYNC_LIMIT_TABLE	861	
583	008F	SYNC_N	1143	1147

STMT#	ADDR	LABEL	MOD 36	05/18/76	AN/BRN-7	STMT#	WHERE REFERENCED
1293	/ 03E5	TF_TIME_UPDATE				1286	
5404	/ 1F50	THA_P_STAR				1323	
2733	/ 0947	THETA_C				4577	
622	/ 00C0	THETA_P				2408	3320 3325
7082	/ 0010	THIRD				1595	1902 1970 4612
4122	/ 0006	THREE_DIGITS				7032	7045 7050 7055
619	/ 008C	TIME				3975	
604	/ 00A8	TIME_INC				791	1006 1008 1159 1576 2976 3552 4885 6220
6614	/ 1811	TIME_INC2				1574	1578 2199
7114	/ 0041	TIME_INC3				6590	6738
5402	/ 1F4C	TIME_STAR				7105	
2065	/ 07C1	TIME_UPDATE_P				4387	
2082	/ 07DE	TIME_UPDATE_X					
779	/ 0080	TITLE				767	
767	/ 0155	TITLE_LINK					
1268	/ 03C1	TRACKING_FILTER				2208	2679 2706
2234	/ 08B5	TRACKING_FILTER_MEASUREMENT					
538	/ 0018	TRUE_AIR_SPEED_INPUT				1834	
537	/ 001A	TRUE_HEADING_INPUT					
4121	/ 0005	TWO_DIGITS				6792	
6944	/ 0C4D	TYPE_DYN_RNG_DATA				6573	
6616	/ 1815	TYPE_NAV_PERF_OUTPUT				6401	6637 6960 6962
5254	/ 1C04	TYPE_OUT				6395	
6433	/ 18C8	TYPE_TABLE				2226	
58	/ 0000	UC				2207	2226
81	/ 0000	UCO				3797	3861 3900 3981 4000 4070
4117	/ 0001	UPPER_LEFT_KEY				3936	4030 4041 4045 4061
4118	/ 0002	UPPER_RIGHT_KEY				1879	3576 4546
5444	/ 1FF4	V_INSERT				2386	2430 4284
5109	/ 1722	V_LAMBDA				1866	4651
618	/ 00B8	V_TAS				4585	4652
5401	/ 1F4B	V_TAS_STAR				3819	4139
4647	/ 14EE	VARSAVE				621	1897 1929 4803 6222
620	/ 00BE	VC2				4243	4579
5403	/ 1F4E	VC2_STAR				1928	
621	/ 00BF	VC3				1032	6478 7139
1834	/ 0690	VELOCITY_PROCESSING					
50	/ 0004	VERIFY_ON				599	1337 1898 6221
598	/ 00A2	V2				1336	
599	/ 00A3	V3				4001	4022 4024 4067 4092
601	/ 00A5	WINDOWAD				3934	3958 4034
4120	/ 0004	WITH_ACCEPT_LIGHT				5794	5797
5832	/ 1A2A	WRITE_DATA					

MCD 36 05/18/76 AN/BRN-7
STMT# WHERE REFERENCED

STMT# / ADDR LABEL
39 / 8802 WRITE_FILE_GAP
5830 / 1A23 WRITE_LBUC
5264 / 1C27 X
5275 / 1CED XX
5258 / 1C1E XXX

5816 5824 2022 2087 2121 2558 2634 2638 4268 4271 5265 5266
2086 2092 2570 2601 2602 2608 2619 2645 2805
671 2085 2104 2123 2126 2146 2147 2161 2192 2565 2661 3328

5259 6104 6730

671 / 00FF XXX_ADD

2096 2644 2711

5274 / 1CE8 XXXX

2023 2162 2662 2803 6237

5276 / 1CF6 X2XX

2108 2635 2716

2867 / 08ED Y_MINUS_MX

2571

5432 / 1FA6 Y_P

1201 1727